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RESULTS OF HEAT TRANSFER TESTS

OF AN 0.0175-SCALE SPACE SHUTTLE

VEHICLE MODEL 22 OTS IN THE NASA-AMES

3.5-FOOT HYPERSONIC WIND TUNNEL (IH3)

VOLUME I

Ву

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Prepared under NASA Contract Number NAS9-13247

Ву

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for

Engineering Analysis Division

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ARC 3.5-178

NASA Series Number: Model Number:

IH3 22 OTS

Test Dates:

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Ву

Thomas F. Foster, Rockwell International Space Division William K. Lockman, NASA-Ames Research Center

ABSTRACT

Heat-transfer data for the 0.0175-scale Space Shuttle Vehicle 3 are presented in this data report. Interference heating effects were investigated by a model build-up technique of Orbiter alone, tank alone, second, and first stage configurations.

The test program was conducted in the NASA+Ames 3.5-Foot Hypersonic Wind Tunnel at Mach 5.3 for nominal free-stream Reynolds number per foot values of 1.5×10^6 and 5.0×10^6 .

This report is presented in four volumes. The contents of the volumes are as follows:

✓ VOLUME I PLOTTED EXTERNAL TANK DATA

VOLUME II PLOTTED SRB DATA

VOLUME III PLOTTED ORBITER DATA

VOLUME IV TABULATED SOURCE DATA

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(D):	HI/HU	vs.	PHI	(J): HI/HU vs.	S	
(E):	H/HREF	vs.	x/c	(K): H/HREF vs.	Z/8V	
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INTRODUCTION

The experimental investigation documented in this report was performed to obtain aerodynamic heat-transfer rate data on the space shuttle vehicle 3 first and second stage configurations. A component build-up of orbiter alone, tank alone, orbiter plus tank, and fully mated launch configuration was utilized to investigate component interference effects.

The test program was conducted in the NASA-Ames 3.5-Foot Hypersonic Wind Tunnel at Mach 5.3 and nominal free-stream Reynolds number per foot values of 1.5 x 10^6 and 5.0 x 10^6 . The model angles of attack were 0°, -3° , -5° and 20° (SRB alone) and angles of yaw were 0° and -5° .

NOMENCLATURE

	Plot	
Symbol	Symbol	Definition
b		thickness of model skin
В		span length
С		specific heat of model skin material or OMS crease
С		chord length
c _o , c ₁ , c ₂		constants in curve fit for C over model wall temperature range
с _р		specific heat of air stream (perfect gas value)
CHAN	CHAN	recording-system channel
Haw	HAW	adiabatic wall enthalpy
Ht	нт	free-stream total enthalpy
	НО	average of free-stream total enthalpy values of all tunnel runs incorporated into an aero dataset
H _W	HW	enthalpy based on model wall temperature for given T/C location
h	Н	heat-transfer coefficient at model wall for given T/C location
href	HREF	stagnation-point heat-transfer coefficient for reference sphere
h/href	H/HREF	ratio of model heat-transfer coefficient to heat-transfer coefficient of reference sphere for Haw/Ht = X.XXX
	HI/HU	interference to undisturbed heat transfer coefficient ratio
IML		inner module line
L	Length	model reference length

NOMENCLATURE (Continued)

		lot	
ЗУ	nbol Syn	<u>nbol</u> <u>Defi</u>	nition
M∞	MA	CH free	-stream Mach number
Pt	PT	free-	stream total pressure
	P0	avera of al datas	age of free-stream total pressure values Il tunnel runs incorporated into an aero set
q	Q	heat- locat	transfer rate at model wall for given T/C
q _s	QS	stagn spher	ation-point heat-transfer rate for reference e at initial time
R_{S}	RS	refer to 0.	ence sphere radius at model scale equivalent 305 m (1 ft) for full-scale vehicle
Re∞	/ft	free-	stream Reynolds number per foot
	RN/	(per	ge of free-stream Reynolds number values foot) of all tunnel runs incorporated into ro dataset
Re∞	,L	free- refer	stream Reynolds number based on model ence length, L
	S	assum see F	ed chordwise location (for Clusters Band C) - igure 2
St	ST	and th	on number based on free-stream flow conditions ne model heat-transfer coefficient for the conditions to the coefficient for th
T		tempe	rature
Tt	TT	free-s	stream total temperature
	TO	averaç of al datase	ge of free-stream total temperature values tunnel runs incorporated into an aero

NOMENCLATURE (Continued)

Symbol Symbol	Plot Symbol	Definition
Tw	TW	model wall temperature for given T/C location
T/C	T/C	thermocouple
t		time
ti	TIME	initial time (before model insertion into flow) extrapolated from $f(T_{\mbox{\scriptsize W}})$ vs time
u,V		velocity
W		density of model skin material
X		axial distance measured from nose
	X/C	chordwise location, fraction of local chord
	X/L	longitudinal location, fraction of body length
Y		spanwise distance from centerline
	2Y/B	spanwise location, fraction of semi-span
Z		water plane distance
	Z/BV	spanwise location on vertical tail, fraction of exposed span
Θ		tank radial position measured clockwise looking forward, O degrees at bottom centerline
α	ALPHA	angle of attack, degrees
β	BETA	angle of sideslip, degrees
μ		viscosity of air
ρ		density of air
ф		Orbiter radial position measured clockwise looking forward. O degrees at bottom centerline

NOMENCLATURE (Concluded)

Symbol	Plot Symbol	Definition
ψ		SRB radial position measured clockwise looking forward. O degrees at bottom centerline
SUBSCRIPTS	<u>S</u>	
aw		adiabatic wall •
i		initial value before model insertion into tunnel flow
0		Orbiter
PG		perfect gas (calorically and thermally perfect gas)
S		reference sphere
S		SRB
t		free-stream total condition
Т		tank
V		vertical tail
W		wall
∞		free-stream

REMARKS

Tunnel blockage was suspected during the first stage (mated) $\alpha = -5^{\circ}$ runs, but could not be confirmed due to inconclusive shadowgraph data. Therefore, additional data were taken at $\alpha = -3^{\circ}$. Both $\alpha = -3^{\circ}$ and -5° data are presented in this report; however, the $\alpha = -5^{\circ}$ data are questionable.

Near the end of the test program the number of test runs used to obtain a complete mapping of the mated-vehicle heating rates was reduced from seven to five to conserve test time. The data acquisition capacity is 75 thermocouple channels per run. This reduced the number of recorded thermocouples from 525 to 375 for these runs (runs with T/C hook-up numbers 12 and 13).

A post-test analysis and dimensional check of the model were performed on the orbiter to investigate suspected incorrect data from wing leading edge clusters B and C. As a result of this investigation, the thermocouple locations and skin thicknesses presented in Table IV and figure 2a were found to be incorrect for clusters B and C. Figure 2b presents the correct locations and thicknesses. The data presented in the plots and tabulated listings reflect the pretest locations and skin thicknesses and should be scaled accordingly. Data reports for other tests of this model are also in error due to the clusters on the wing leading edge. These test data should be corrected for the test data publications of tests OH4B, IH2O, and OH6.

CONFIGURATIONS INVESTIGATED

The 22-OTS model is a 0.0175-scale replica of the vehicle three configuration Rockwell International Space Shuttle orbiter, tank, and solid rocket boosters. The model is a thin-skin thermocouple model instrumented with 527 30-gauge iron-constantan thermocouples. The structural areas of the model were constructed of 15-5PH stainless steel with instrumented areas of 15-5PH and 17-7PH stainless steel.

Provisions have been made to test elevon deflections of -40°, 0°, +5, and +10°; body flap deflections of 0° and +10°; and rudder flare of 0° and 40°. For this ascent test, all control surfaces were tested at 0° deflection.

The configurations tested are described below with the component definitions given in table III.

<u>Symbo</u>	1

ORB	B ₁₇ C ₇ M ₄ F ₅ W ₁₀₃ E ₂₂ V ₇ R ₅	Orbiter
ET	T ₁₀	external tank
SRB	s ₈	solid rocket booster
OTS	$^{\rm B}_{17}$ $^{\rm C}_{7}$ $^{\rm M}_{4}$ $^{\rm F}_{5}$ $^{\rm W}_{103}$ $^{\rm E}_{22}$ $^{\rm V}_{7}$ $^{\rm R}_{5}$ $^{\rm T}_{10}$ $^{\rm S}_{8}$	mated vehicle
TRIPS		.050" steel spheres spot welded to .005" shim stock band 1/4 inch wide. Center- line displacement between trips was 3 diameters

TEST FACILITY DESCRIPTION

The NASA-Ames 3.5-Foot Hypersonic Wind Tunnel is a closed-circuit, blowdown-type tunnel capable of operating at nominal Mach numbers of 5, 7, and 10 at pressures to 1800 psia and temperatures to 3400°R for run times to four minutes. The major components of the facility include a gas storage system where the test gas is stored at 3000 psi, a storage heater filled with aluminum-oxide pebbles capable of heating the test gas to 3400°R, axisymmetric contoured nozzles with exit diameters of 42 inches for generating the desired Mach number, and a 900,000 ft³ vacuum storage system which operates to pressures of 0.3 psia. The test section itself is an open-jet type enclosed within a chamber approximately 12-feet in diameter and 40-feet in length, arranged transversally to the flow direction.

A model support system is provided that can pitch models through an angle-of-attack range of -20 to +20 degrees, in a vertical plane, about a fixed point of rotation on the tunnel centerline. This rotation point is adjustable from 1 to 5 feet from the nozzle exit plane. The model normally is out of the test stream (strut centerline 37-inches from tunnel centerline) until the tunnel test conditions are established after which it is inserted. Insertion time is adjustable to as little as 1/2 second and models may be inserted at any strut angle.

A high-speed, analog-to-digital data acquistion system is used to record test data on magnetic tape. The present system is equipped to measure and record the outputs from 80 transducers in addition to 20 channels of tunnel parameters.

TEST PROCEDURES

The data acquisition capability was 75 recorded thermocouples per run. Since there were 525 T/C's selected for mated launch-configuration testing, seven runs were necessary for a complete mated heating distribution. Cannon plugs with 15 thermocouples for full data acquisition capability were used at the model. A five plug junction (connector) box was constructed to mate the model plugs to the facility's 150°F reference box terminal posts. Most model changes were, therefore, simple plug changes between runs.

Due to the complexity of the mated configuration sting arrangement, oil-flow visualization techniques were employed to confirm that there were no sting-interference effects.

Shadowgraphs were taken for each run. Sting-effect shadowgraphs were also obtained for selected runs.

DATA REDUCTION

All test data were reduced at the NASA/Ames Research Center using the data reduction techniques outlined below. The thermocouple data were reduced using the one-dimensional, thin-wall equation:

$$\dot{q} = WCb \frac{dT_W}{dt} = h (H_{aw} - H_W) = hH_t \left(\frac{H_{aw}}{H_t} - \frac{H_W}{H_t}\right)$$
 (1)

which neglects heat-conduction losses.

Assuming that W and h are constant and

$$C = C_0 + C_1 T_W + C_2 T_W^2 \text{ for } T_W \text{ ranges}$$
 (2)

the integration of equation (1) for $t = t_i$ to t and $T_w = T_{w_i}$ to T_w yields the linear equation:

$$f(T_{w}) = - \ln \left(\frac{T_{aw}^{i} - T_{w}}{T_{aw}^{i} - T_{w_{i}}} \right) - \left[\frac{c_{1}}{c_{aw}^{i}} + \frac{c_{2}}{c_{aw}^{i}} \left(T_{aw}^{i} + \frac{T_{w} + T_{w_{i}}}{2} \right) \right]$$

$$(T_{w} - T_{w_{i}}) = \frac{hc_{p}}{WC_{aw}^{i}} (t - t_{i})$$
(3)

where it is defined that:

$$T'_{aw} \equiv \frac{H_{aw}}{c_p} = \frac{H_{aw}}{H_t} + \frac{H_t}{c_p} \ge (T_{aw})_{PG}$$
 (4)

$$C_{aw}^{i} = C_{o} + C_{1} T_{aw}^{i} + C_{2} T_{aw}^{i} 2$$
 (5)

specific heat at adiabatic wall temperature

The form of Eq (3) is $f(T_W) = mt + b$ where m is the slope and b is the intercept for a straight line if heat-conduction errors are negligible. Thus, deviations from a straight line can indicate heat-conduction effects.

DATA REDUCTION (Continued)

The slope, m, of $f(T_W)$ vs t from Eq (3) is computed by a least-squares, straight-line fit over a finite time interval (approx. 1 sec.) beginning when the model reaches uniform tunnel flow. The value of the heat-transfer coefficient, h, is then determined from:

$$h = \frac{WC_{aw}^{\dagger}b}{c_{p}} m \tag{6}$$

Using this value of h, the heat-transfer rate is evaluated at the initial time, t_i , when the model is isothermal at the initial wall enthalpy, $H_{W_{\bar{i}}}$

$$\frac{\dot{q} = \dot{q}_i = h \left(H_{aw} - H_{w_i}\right)}{H_{t}} = hH_{t} \left(\frac{H_{aw}}{H_{t}} - \frac{H_{wi}}{H_{t}}\right)$$
 (7)

where H_{aw}/H_{t} is the same value used to evaluate h. The resultant value of \dot{q} is independent of the value of H_{aw}/H_{t} used for both the h and \dot{q} evaluations.

The reference sphere heating is also evaluated at the initial wall enthalpy by the method of Fay and Riddell (ref. 2):

$$\frac{\dot{q}_{s} = h_{ref} (H_{t} - H_{w_{i}})}{H_{t}} = h_{s} H_{t} \left(1.0 - \frac{H_{w_{i}}}{H_{t}}\right)$$
(8)

The model-to-sphere ratio of heat-transfer coefficients is then determined from Eqs. (7) and (8) as

$$\frac{h}{h_{ref}} = \frac{\dot{q}_{i}}{\dot{q}_{s}} \left[\frac{1.0 - \frac{H_{\dot{w}_{i}}/H_{t}}{H_{aw}/H_{t} - H_{\dot{w}_{i}}/H_{t}}}{\frac{H_{aw}/H_{t} - H_{\dot{w}_{i}}/H_{t}}{H_{aw}/H_{t}}} \right]$$
(9)

DATA REDUCTION (Concluded)

where \dot{q}_i is constant for all values of H_{aw}/H_t .

To determine h/h_{ref} for various values of H_{aw}/H_t , the particular value of H_{aw}/H_t is substituted into Eq. (9).

The Stanton number is defined as

$$St = \frac{h}{\rho u} = \frac{\dot{q}_i}{\rho u(H_{aw} - H_{w_i})}$$
 (10)

where for free-stream conditions, $\rho u = \rho_{\infty} V_{\infty}$.

The calculations of the model heating, reference sphere heating, and Reynolds number included the corrections of NACA report 1135 (ref. 3) for calorically imperfect thermally perfect air. Keyes' equation for viscosity (see ref. 4) was also used for the sphere heating and Reynolds number computations:

$$\mu = \frac{0.0232 \times 10^{-6} \text{ T}^{0.5}}{1 + \frac{220}{T} \times 10^{-9/T}}$$
(11)

where the units for T and μ are °R and 1b-sec/ft, respectively.

REFERENCES

- 1. Foster, J. F.: Pre Test Information for Testing of the 22-0TS 0.017-scale Thinskin Thermocouple Model in the Ames Research Center 3.5-Ft Hypersonic Wind Tunnel, October 1, 1973 Rockwell International Report No. SD73-SH-0259.
- 2. Fay, J. A.; and Riddell, F. R.: Theory of Stagnation Point Heat Transfer in Dissociated Air. J. Aeron. Sci;, Vol. 25, No. 1, Feb. 1958, pp. 73-85.
- 3. Ames Research Staff: Equations, Tables, and Charts for Compressible Flow. NACA Rept. 1135, 1953.
- 4. Bertram, Mitchel H.: Comment on "Viscosity of Air." J. Spacecraft Rockets, Vol. 4, No. 2, Feb. 1967, pp. 287-288.

TEST : IH3 (ARC 3.	5 #178) NOMI TEST CON		DATE: 11/9/73
MACH NUMBER	REYNOLDS NUMBER (per ft)	TOTAL PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Rankine)
5.3	1.5 x 10 ⁶ 5.0 x 10 ⁶	120 405	1300
BALANCE UTILIZED:	None		
NF SF AF PM RM YM	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
COMMENTS: The rmoc	ouple Teśt		

TABLE II

	h	L	_		,		,	T	EST	RUN	NU	MBE	RS								3, 3	?	> 0 2]
1973	N K	$I \wedge I$														779	77	00		69	י ו	H,T	(S)	11	Æ.
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mber	(SEE	$\times_{\mathbf{k}}$								 -		56	59	09	+	—	-	-			G	=	ε		1SET
DATE: NOVEMBERD.	×	\times_7	∞	6,	25	26	33				-		ļ					-	-			MACH	IDVAR		DATASET
ATE:	SCHEDULE (1/c),X	×	7	7/	24	27		+										-	-] 5	M			st of
<u>م</u>	DULE	×	//	12	<u> </u>		-	+-			-			-		-					55				character
RΥ	SCHE	× 4	5	5	22	<u> </u>	1	 	777	51	52					-	-	-		-					
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SET/RUN NUMBER COLLATION SUMMARY	THERMOCOUPLE	X ₂	3 /	7 /	20 5	31 3		 	 	-		 		_	_				-	_				ا ا	Key to
OLLA.	HERM	×	6	1 8	6/		-		7 46	77 8	5						_	-	-		£4				tor H
ER C	NO.	٠,	Ĭ	-	/	32	39	40	147	4	5,						<u>.</u>	_					S T		24
NUME		ě																			37	-	OEFFICENT		Page:
/RUN	AMETERS/VALUES		1																		-	4	COEF		See Pe
A SET	AMETEI																				31	1			ഗ് *
DAT	PAR	RWL	1.5	15.0	1.5	5.0	5.0		5.0	1.5		1.5	5.0	5.0	<u>.</u> .	1.5	5.0	5.0		5.0	25	1			¥
	SCHD.	8	0	0	0	0	0 -5	0	0	00	0	0	0	0	0	0	0 0	30 0	0	0		}			00
-тн3					S	7.5													-		61	4			/HT=1.0 /HT=.9
1.78	CONFIGURATION				TRIPS	TRIPS				TRIPS	TRIPS			TRIPS	TRIPS				TRIPS	TRIPS		1			TAMAT TAMAT
3.5	NFIGU		\$TS	\$T\$	I	7	Ø78	ØRB	ØRB			ET	ET	TRI	TR	SRB	SRB	SRB	ı	TR	- 13	1		18	_
	ខ				Ø15	ØTS			, A	ØRB	ØRB	7	4	ET	ET	נט	S	S	SRB	SRB		4		ES	DATHSETS
: ARC	DATA SET	FIER		07	03	770	05	90	07	80	60	0	=	72	5	1	5	9		18	-	"HREF1"	C OR B	SCHEDULES	1 /
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NASA-MSFC-WAF

a OR β SCHEDULES

TABLE III. - COMPONENT DIMENSIONAL DATA

MODEL COMPONENT: BODY - B17	
GENERAL DESCRIPTION: Fuselage, 3 configurati	on, lightweight orbiter per
Rockwell lines drawing No. VL70-000139	·
MODEL SCALE: 0.0175	
DRAWING NO.: VL70-000139	
DIMENSIONS:	FULL SCALE MODEL SCALE
Length - In.	1290.3 22.58025
Max. width - In.	267.6 4.6830
Max.depth - In.	244.5 4.27875
Fineness Ratio	4.82175 4.82175
Area - ft ²	
Max. Cross-sectional	386.67 0.11842
Flanform	
Wetted	
B ase	·

MODEL COMPONENT: CANOPY - C7		
GETERAL DESCRIPTION: Configuration 3 per Rockwell Line	es VL70-000139	
Insufficient information to complete dimensional data a	at this time.	·
MODEL SCALE: 0.0175		
DRAWING NUMBER: VL70-000139		
DIMENSIONS:	FULL SCALE	MODEL SCALE
Length ($X_0 = 433$ to $X_0 = 670$) - in FS	237	4.148
Max. Width		
Max. Depth ($Z_0 = \text{to } Z_0 = 501$) in FS		
Fineness ratio		
Area - ft ²		
Max. Cross-sectional		· · · · · · · · · · · · · · · · · · ·
Planform		•
Wetted		
Base		

TABLE III. - COMPONENT DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ELEVON- E22								
GENERAL DESCRIPTION: 3 configuration per W103 Rockwell Lines Drawing								
VL70-000139 data for (1) of (2) sides.								
SCALE MODEL: 0.0175								
DRAWING NUMBER: VL70-000139								
DIMENSIONS:	FULL SCALE	MODEL SCALE						
Area - ft ²	205.52	0.06294						
Span (equivalent) - In.	353.34	6.18345						
Inb'd equivalent chord	114.78	2.00865						
Outb'd equivalent chord	55.00	0.96250						
Ratio movable surface chord/ total surface chord								
At inb'd equiv. chord	208	.208						
At outb'd equiv. chord	.400	.400						
Sweep-back angles, degrees								
Leading edge	0.00	0.00						
Trailing edge	- 10.24	- 10.24						
Hingeline	0.00	0.00						
Area Moment (Normal to hingeline) - ft3 (Product of Area Moment)	1548.07	0.00829						

MODEL COMPONENT: BODY FLAP - F5		
GENERAL DESCRIPTION: 3 Configuration per Rocky	rell Lines VL70-000139	
		
MODEL SCALE: 0.0175		
DRAWING NUMBER: VL70-000139		
DIMENSIONS:	MILL SCALE	MODEL SCALE
Length - In.	84.70	1.48225
Max. width - In.	267.6	4.6830
Max. Depth	-	
Fineness Ratio		
Area - ft ²		
Max Cross-sectional		
Planform	142.5195	0.04365
Wetted		
Base	38.0958	0.01167

MODEL COMPONENT: OMS POD - MQ		
GENERAL DESCRIPTION: Orbital maneuvering system pods	located on the	orbiter
aft fuselage.		
MODEL SCALE: 0.0175		
DRAWING NUMBER: VL70-000139	·	
dimensions:	FULL SCALE	MODEL SCALE
Length - In.	346.0	6.0550
Max. Width - In.	108.0	1.890
Max. Depth - In.	113.0	113.0
Fineness Ratio		
Area - ft ²		
Max cross sectional	******************	
Planform		***************************************
Wetted	***************************************	
Base		
6 of OMS Pod		
WP = 463.9 In. FS; WP 400 + 63.9 = 463.9		
BP = 80.0 In. FS		
•		

LENGTH: 1214.0 to 1560.0 = 346.0 In. FS

NOTE: M_{\downarrow} is identical to M_3 of 2A configuration, except intersection to body.

MODEL COMPONENT: RUDDER - R5		
GENERAL DESCRIPTION: 2A, 3 and 3A configuration per	Rockwell Lin	es Drawing
VI.70-000095		
MODEL SCALE: 0.0175		
DRAWING NUMBER: V170-000139, V170-000095		
DIMENSIONS:	FULL SCALE	MODEL SCALE
Area - ft ²	106.38	0.03258
Span (equivalent) - in.	201.0	3.5175
Inb'd equivalent chord	91.585	1.60274
Outb'd equivalent chord	50.833	0.88958
Ratio movable surface chord/ total surface chord		
At inb'd equiv. chord	0.400	0.400
At outb'd equiv. chord	0.400	0.400
Sweep-back angles, degrees		
Leading edge	34.83	34.83
Trailing edge	26.25	26.25
Hingeline	34.83	34.83
Area Moment (normal to hingeline) - ft ³ Product of area and mean chord	526.13	0.00282

MODEL COMPONENT: BOOSTER SOLID ROCKET MOTOR - S8		
GENERAL DESCRIPTION: Booster solid rocket, 3 configur	ation, body	of
revolution, data for (1) of (2) sides per Rockwell Lin		
VL77-000036 and VL72-000088		
MODEL SCALE: 0.0175		
DRAWING NUMBER: VL72-000088, VL77-000036		
DIMENSIONS:	YULL SCALE	MODEL SCALE
Length (Includes nozzle) - In.	1741.0	30.468
Max. Width (Tank dia.) - In.	142.0	2.485
Max. Depth (Aft shroud) - In.	205.0	3.588
Fineness Ratio	8.49268	8.49268
Area - ft ²		
Max. Cross-sectional	229.21	4.011
Planform		
Wetted		
.Ba.se		
WP of BSRM Centerline (Z_T) - In.	400.0	7.00
FS of BSRM Nose (X_T) - In.	200.0	3.50

MODEL COMPONENT: EXTERNAL TANK - TIO		
GENERAL DESCRIPTION: External Oxygen-hydrogen tank,	3 configurat	ion, per
Rockwell Lines drawing VL78-000041 and VL72-000088		
MODEL SCALE: 0.0175		
DRAWING NUMBER: VL72-000088, VL78-000041		
DIMENSIONS:	FULL SCALE	MODEL SCALE
Length - In. (Nose @ $X_T = 309$)	1865	32.63750
Max. width (Dia) - In.	324	5.670
Max. depth	-	
Fineness Ratio	5.75617	5.75617
Area - ft ²		
Max. Cross-Sectional	<u>572.55</u> 5	0.17534
Planform		
Wetted		·
B ase		
WP of Tank Centerline $(X_{\underline{T}})$ In.	400.0	7.00

TABLE III. - COMPONENT DIMENSIONAL DATA - Continued

TABLE III COMPONENT DIMENSIONAL DATA	l - Continued	l .
MODEL COMPONENT: VERTICAL, V7 (Lightweight Orbiter Co	onfiguration)	
GENERAL DESCRIPTION: Centerline vertical tail, double	e-wedge airfo	oil with
rounded leading edge.		
MOTE: Same as V5 but with manipulator housing removed	l.	
MODEL SCALE: 0.0175		
DRAWING NUMBER: VL70-000139, VL70-000095		
DIMENSIONS:	FULL SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) - ft ² Planform	425.92	0.13044
Span (Theo) - In. Aspect ratio	315.72 1.675	5.52510 1.675
Rate of taper Taper ratio	0.507	0.507
Sweep-back angles, degrees	0.404	0.404
Leading edge	45.000	45.000
Trailing edge	26.249	26.249
0.25 Element line	41.130	41.130
Chords:		
Root (Theo) WP	060 50	1 6-0
Tip (Theo) WP	<u>268.50</u> <u>108.47</u>	4.69875
MAC	199.81	1.89822
Fus. Sta. of .25 MAC	1463.50	3.49667 25.61125
W.P. of .25 MAC	635.522	11.12164
B.L. of .25 MAC	0.00	0.00
Airfoil section:		
Leading wedge anble - deg.	10.000	10.000
Trailing wedge angle - deg.	14.920	14.920
Leading edge radius	2.0	0.0350
Void area - FT ²		-
	13.17	0.00403
Hlanketed area	0.00	0.00

	ines VI70-00013	10
ENERAL DESCRIPTION: Configuration 3 Orbiter per I		77•
NOTE: Same planform as W87, except dihedral at TE	<u>}</u>	····
	·	
Scale Model = 0.0175		
EST NO.	DWG. NO. VL	70-000139
IMENSIONS:	FULL-SCALE	MODEL SCAL
TOTAL DATA		
Area (Theo.) Ft ²	2690.00	0.82381
Planform	936.68	16.39190
Span (Theo In. Aspect Ratio	2.265	2.265
Rate of Taper	1.177	1.177
Taper Ratio	0.200	0.200
Dihedral Angle, degrees (@ TE of Elevon)	3.500	3.500
Incidence Angle, degrees	3.000	3.000 +3.000
Aerodynamic Twist, degrees	+3.000	13,000
Sweep Back Angles, degrees Leading Edge	45.000	45.000
Trailing Edge	-10.24	-10.24
0.25 Element Line	35.209.	35.209
Chords:		
Root (Theo) B.P.O.O.	689.24	12.06170
Tip, (Theo) B.P.	137.85	2.41238 8.30918
MAC	474.81 1136.89	19.89558
Fus. Sta. of .25 MAC W.P. of .25 MAC	299.20	5.2360
B.L. of .25 MAC	182.13	3,18728
EVENCEN DATA		
Area (Theo) Ft ²	1752.29	0.53664
Span, (Theo) In. BP108	720.68	12.61190
Aspect Ratio	2.058	2.058
Taper Ratio	0.2451	0.2451
Chords	562.40	9.8420
Root BP108	137.85	2.4123
Tip 1.00 <u>b</u>	And the last of th	
MAC	393.03	6.87802 20.74292
Fus. Sta. of .25 MAC	1185.31 300.20	5.2535
W.P. of .25 MAC B.L. of .25 MAC	251.76	2.5158
Airfoil Section (Rockwell Mod NASA)		
XXXX-64	0.10	0.10
Root b =	0.10	
7	0.12	0.12
Tip b =	·	
Data for (1) of (2) Sides		•
Leading Edge Cuff 2		
Planform Area Ft"	120.33	0.0368
Leading Edge Intersects Fus M. L. 0 Sta	560.0	9.800 18.1125

Table IV. Orbiter T/C Locations Model 22-OTS

					Model					
		FULL S	SCALE		MODEL	SCALE				
T/C NO.	Ţ	x _o	y	Z	x NOSE	У	Z	ø	SKIN THICK NESS	REMARKS
V 1	0	238.00	0		0	0		0	.034	BOTTOM Q
٧ 2	.005	244.45		A	.113	A	Å	A .	.035	Å
√.3	.010	250. 90			.226				.035	
A	.020	263.81			.452				.032	
5	.030	27 6.71			.677				.033	
√6	.040	289.61			•903				.034	
7	.050	302.52			1.129				.033	
∪8	.060	315.42		-	1.355				.032	
9	.070	328.32			1.581				.034	
10	.080	341.22			1.806				-035	
11	.090	354.13			2.032				.035	
12	.100	367.03			2.258				.034	BOTTOM &
13										OPEN
14	.120	392.84			2.710				.035	воттом є
15	.130	405.74			2.935				.035	A
16	.140	418.64			3.161		F		.035	
17	.150	431.54			3.387				.034	
18	.160	444.45			3.613				.035	
19	.170	457.35			3.839				.035	
20	.180	470.25			4.064				.035	
21	.190	483.16			4.290				.035	
22	.200	496.06			4.516				.03/	
23	.225	528.32			5.081				.031	
24	-250	560.58			5.645				.033	
25	.275	592.83			6.210				.033	
26	.300	625.09			6.774				.032	
27	.325	657.35			7.339				.033	
28	.350	689.60			7.903				.020	
29	.375	721.86			8.468				.028	
30	.400	754.12			9.032				.033	
31	.425	786.38	*	*	9.597	*	*	Y	.035	
32	.450	818.64	0		10.161	0		0	.034	BOTTOM &

Table IV (Cont'd) Orbiter

		FULL	SCALE		MODEL SCALE		Γ			I	
r/c No.	Ľ Ľ	x _o	У	Z	(x NOSE)	У	Z	*	SKIN THICK NESS	REMARKS	
33	-475	850.89	0		10.726	0		0	.030	BOTTOM &	1
34	•500	883.15	A	1	11.290	. 4	1	1	.030	† · · · · · · · · · · · · · · · · · · ·	1
35	.525	915.41			11.855				.032		
36	.550	947.66			12.419			П	.031		
37	.575	979.92			12.984				.029		İ
38	.600	1012.18			13.548				.028		
39	.625	1044.44			14.113			\prod	.028		
40	. 650	1076.70			14.677			П	,033		
41		1108.95			15.242				.035		
42		1141.21			15.806			\prod	.034		•
43	ļ	1173.47			16.371			П	.035		
44	•750	1205.72			16.935				.035		
45	.775	1237.98			17.500				.034		
46	.800	1270.24			18.064				.035		
47	.825	1302.50			18.624				.035		
48	•850	1334.76			19.193				.033		
49	.875	1367.01			19.758				.033		
50	•900	1399.27			20.322				.034		
51	•925	1431.53			20.887				.035		
52	•950	1463.78			21.451				.032	*	
53		1496.04			22.016					BOTTOM @	
54		1528.3			22.580				029	×=1.008@δ ₂₀ =10%	.033
55		1541.56			22.812				.032	b _{BF} 10° ONLY ▲	
56		1560.56			23.145				.032	BF	
57		1574.30			23.385			Y	.032	8 BF 10 ONLY	
58		1592.82			23.709			0	.030	I.	.032
59	.010	250.90			•226			180	.035	TOP C	
60	.025	270.26			•565				.035	1	
61	•050	302.52			1.129			T	.035		
62	.075	334.77			1.694				1033		
63	.100	367.03	V	*	2.258	V	*		033	*	
64	.125	399.29	0		2.823	0			.03/	TOP &	1

Table IV (Cont'd) Orbiter

		1				-						T	7	T	·
L.		FULL	SCA	LE	·	 .	MODE	L SC	LE						
r/c No.	X L	x _o		y	Z	•	* NOSE	3	7		Z	\$	SKIN THIC NESS		REMARKS
65°	.150	431.54)			3.387)]-	-	180	.026	TOP	€.
66	.160	444.45	14		1		3.613					A	03/		
67	.170	457.35					3.839					П	.031	.	
68 /	.180	470.25					4.064					\prod	.030		
69 V	.200	496.06					4.516					\prod	.033		
70	-250	560.58					5.645				_		.030	1	
710	.300	625.09					6.774	7-7			[††-	.030	 	
72	.400	754.12					9.032					11	.030	1	
73	•500	883.15					11.290						.030		· ·
74 V	•600	1012.18					13.548						03/	1 +	
75	.700	1141.21	1		Y		15.806	1	,	П	,	V	.032	+	
76	.800	1270.24	0				18.064	0			-	180		1	<i>P</i>
77			29.	60	478.	00	WINDOW #1	0.5		8.:	365		035		LEFT
78			12.	80	478.	00	WINDOW #1	0.2	_				-035		RIGHT
79%			21.	20	464.	97	A	0.3				A	1.033		
80			34.	40	452.	00	•	0.6	02	7.9	10	1		 	OM LEFT
81			6.	00	452.	00	WINDOW #1	0.1	05	7.9	10	+	-034		OM RIGHT
82			43.	20	478.	00	WINDOW #2	0.7	56	8.3	365	+	.035		
83			34.	80	478.	00	WINDOW #2	0.6	09	8.3	65	+	.035		RIGHT
84 v			44.8	30	464.	97	<u> </u>	0.7	84	8.1	.37	1	.035		
85			59.2	20	452.	00	*	1.0	36	7.9	10	+			OM LEFT
86			40.4	10	452.	00	WINDOW #2	0.70			-	<u> </u>	1		OM RIGHT
87 ^t			62.4	10	464.	97	WINDOW #3.	† ——					,032		
88	-100	367.03	20.0	00		_	2.258	0.3	- 1			10			AGE BOTTOM
89	.150	431.54	24.0	00			3.387	0.42	-			10	.035		URFACE
90	•050	302.52	25.0	00	1		1.129	0.4					دد. 333ء		1
91 4	-200	496.06	25.0	00	1	1	4.516	0.43	-+	Ā	一,		.03/		
92 V	.300	625.09	25.0	00	1		6.774	0.43		Ŧ					+
93 √	•200	496.06	50.0	0	\top	_	4.516	0.87	- }-			~	.033		
94	.300	625.09	50.0	00	+	\dashv	6.774	0.87	 .				034		
95 Y		754.12	50.0	∤-	+		9.032	0.87	-+-	 {·^	<u>}</u>	- 1	.036		
96	.500	883.15	50.0				11.290	0.87			1	1 5	.026	USEL	AGE BOTTOM
									1				026		CFACE

Table IV (Cont'd) Orbiter

		FUI	LL SCALE			MODEL S	CALE		SKIN	
T/C NO.	ř	×o	У	Z	x NOSE	У	z	•	THICK- NESS	REMARKS
97	.600	1012.18	50.00		13.548	0.875		21.5	.021	FUSELAGE SIDE
98	.700	1141.21	50.00		15.806	0.875		A	.033	,
99	.800	1270.24	50.00		18.064	0.875		1	.03 <i>3</i>	
100	.900	1399.27	50.00		20.322	0.875		21.5	.034	FUSELAGE SIDE
101	1.000	1528.30	100.00		22.580	1.75		39	.03/	BODY FLAP
102	1.050	1592.82	100.00		23.704	1.75		39	.028	BODY FLAP .033
103	.100	367.03	39.20		2.258	0.686		20	.033	FUSELAGE SIDE
104	.150	431.54	40.80		3.387	0.714		20	.03/	<u> </u>
105	.050	302.52		303.60	1.129		5.313	22	-03/	C.C.L. TANGENT
106	.100	367.03	52.00		2.258	0.910		24.5	.63.3	4
107	.150	431.54	62.00		3.387	1.085		25.5	-03/	Y
108	.200	496.06	65.60	287.20	4.516	1.148	5.026	31.5	.035	C.C.L. TANGENT
109	.300	625.09	74.46		6.774	1.303		34	.033	
110	.200	496.06	75.60	292.00	4.516	1.323	5.110	35	.030	
111	.150	431.54	79.20	304.80	3.387	1.386	5.334	40	.030	
112	.200	496.06	85.20	298.80	4.516	1.491	5.229	40	-034	
113	.300	625.09	91.43		6.774	1.600		40	.026	
114	.300	625.09	102.86		6.774	1.800		45	.023	
115	.050	302.52		325.60	1.129		5.698	35	.030	M.H.B. TANGENT
116	.100	367.03		317.60	2.258		5.558	39	,030	M.H.B. TANGENT
117	.150	431.54	83.60	314.4	3.387	1.463	5.502	45.	.030	M.H.B. TANGENT
118	.200	496.06		320.00	4.516		5.600		.030	
119	.300	625.09		330.00	6.774	<u> </u>	5.775	57.	5.02/	
120	.300	625.09		340.00	6.774	<u> </u>	5.950	61	.027	
121	.076	336.51		350.00	1.724	<u> </u>	6.125	j	.030	RCS CENTER
122	.300	625.09		350.00	6.774	<u> </u>	6.129	65	.026	
123	.800	1270.24		350.00	18.064		6.125	65	,017	
124	.900	1399.27		350.00	20.322		6.12	65	1,000	
125	.975	1496.04		350.00	22.016		6.12	5 68	.034	
126	.975	1496.04		300.00	22.016				5.032	
127	.050	302.52		342.40	1.129		5.99	2?	5.03C	TANGENT (UPPER)

Table IV (Cont'd) Orbiter

L.		FULL	SCALE	-	MODE	L SCALE				
r/c No.	Ĭ.	x _o	y	2	x NOSE	У	2	1	SKIN	K
128	.200	496.06		360.00	4.516		6 30	- K7	NESS	
129	300	625.09		360.00	1			- 1	5.026	
130	.600	1012.18		375.14			6.56	1		
3.31	.05	0 302.52		378.40			6.62	1	1	
132	1.10	367.03		410.00				+	035	
133	.200	496.06		410.00					5.0ZE	
134	.300	625.09		430.00					6.032	
135	.400	754.12		430.00			1.52.	1	033	
136	.500	883.15		430.00		1	1	10.		
137	.600	1012.18		430.00		1		╁╂	.632	1
138	.700	1141.21		430.00	15.806			╅	.032	
139	.800	1270.24		430.00	18.064		7.525	'	.032	
140	.900	1399.27		370.00	20.322			1	.032	
41	.300	625.09		478.80	6.774		6.475	1	.033	
.42	-400	754.12			9.032	1	3.3/9		.03/	
43	.500	883.15			11.290	1		1	-030	
44	.600	1012.18			13.548	1			.033	
45	.700	1141.21			15.806	1 +			.033	
46	.600	1012.18		445.0	13.548	1 -	7.788		.03Z	
47	.600	1012.18		440.0	13.548					
48	.750	1205.73		450.00	15.806				.632	
49	.750	1502.73]	490.00	15.806	1 7			.032	IIDDED DO
50 🕯	-400	754.12			9.032				.034	UPPER BODY
51	.500	883.15			11.290				.03/	WING UPPER CREAS
52	.600	1012.18			13.548				0/2	
53	1	1141.21			15.806	 			.030	
4		1399.27		332.0	20.322	-		64	.030	Y

Table IV (Continued) Orbiter

T/C	<u>2y</u> b	X .	FULL S	CALE	MOUEL S	CALE	SKIN	REMARKS
NO.	Ь	č	×o	У	×o	У	THICK- NESS	KEIMKKO
155	. 250	•025	640.650	117.085	7.043	2.049	. 031	WING BOTTOM
156	A	.153	754.120		9.030	_ •	.035	SURFACE
157		.299	883.150		11.288		.028	A
158		.444	1012.180		13.545		.023	
159		.590	1141.200		15.802		-034	
160	▼	.736	1270.230	\	18.060	₩	.034	
161	.250	.900	1415.900	117.085	20.613	2.049	.034	
162	.301		754.000		9.030		.023	30° ROLL DOWN
163	- 348		883.000		11.288		.028	30° ROLL DOWN
164	.400	.025	1002.063	187.336	13.364	3.278	.035	
165		.100	1039.750	A	14.031		.034	
166		.200	1090.000		14.900		.034	
167		.302	1141.210		15.802		. 035	
168		.559	1270.230		18.060		.032	
169	*	.700	1341.250	V	19.30 7	V	.032	
170	.400	.900	1441.750	187.336	21.065	3.278	.032	ELEVON
171	.500		1067.470	234.170	14.5 1 6	4.098	. 033	30° ROLL DOWN
172		.025	1077.913	A	14.696	*	.035	
173		.177	1141.210		15.802		.030	
174		.300	1192.450		16.706		.03/	
175		.487	1270.230		18.060		.034	
176		•600	1317.428		18.895		.034	
177		.700	1359.028	\	19.618	•	.033	
178	♦	•900	1442.350	234.170	21.075	4.098	.033	ELEVON
179	.600	.100	1152.000	281.004	15.995	4.918	.033	
180		.200	1188.00	4	16.625		.03/	
181		.300	1224.000		17.255		.026	
182		.428	1270.230		18.064		.026	*
183	1	.600	1332.000	V	19.145	\forall	.027	WING BOTTOM
184	-	.700	1368.000	281.004	19.775	4.918	.024	SURFACE

Table IV (Continued) Orbiter

	T		T				T	T
1/0	2 <u>y</u>	x c	FULL	SCALE	MODEL	SCALE	SKIN	
NO.		С	x _o	у	× (FROM)	У	THICK- NESS	REMARKS
18	5 .600	.800	1404.000	281.004	20.404	4.918	.035	WING BOTTOM —— SURFACE——
18	600	.850	1422.000	‡	20.720		.033	ELEVON A
18	7 .600	.90	1440.000	281.004	21.034		.034	
18	8 .750	↓ .	1186.5	351.255	16.599	6.147	035	L.E. ROLLED
18	9 🛕	.025	1193.428	•	16.720	A	. 035	DOWN 30°
19	0	.100	1214 .2 28		17.084		.032	
19	1	.303	1270.230		18.064		-032	
19	2	.500	1325.028		19.023		.032	
19	3	.700	1380.400		19.992		.027	
19	4	.800	1408.100		20.476	·	.03/	
19	5 ▼	.850_	1422.000		20.719	. 🔻	. 035	
19	 ·	- 900	1435.800	2214233	20.962	6.147	.035	
19	_	.100_	1255.200	398.089	17.801	6.967	.03/	
19		.300	1299.600	398.089	18.578	6.967	.034	
19		•500	1344.000	398.089	19.355	6.967	- 032	
20	 -	•60	1373.028	421.506	19.863	7.376	.024	
20		.30	1314.743	421.506	18.846	7.376	.030	
20			P	444.857		7.785	.035	L.E. ROLLED
20		.050	1295.925		18.514		.035	
20		.100	1303.828	_ _	_18.6 <u>52</u>		.035	,
20	_	*	1335-543		19.207		.024	
20		•500	1367.257		19.762		.022	
20		.7 00	1398.950		20.316	🛨	-035	
208	-	•900	1430.650	*	20.870	7.785	. 030	
20	• •	0.00		452.416	18.708	7.917	.032	L.E.
210	-	0.00		464.914	20.316	8.136	. 63/	L.E.
21	-			281.004		4.918	-035	CLUSTER B
21	-						.035	*
21:				201 004	 	*	.035	WING BOTTON
214	•600			281.004		.4.918	.035	SURF-CE

Table IV (Continued) Orbiter

T/C	2 v	×	FULL	SCA_E	. MODEL	SCALE	SKIN	
NO.	<u>2y</u> b	Ċ	×o	ý	× (FROM) NOSE)	у	THICK- NESS	REMARKS
215	.600			281.1174		4.918	. 035	CLUSTER B
216	.600			281.304		4.918	. 035	SEE FIG. 2
217	.600			281.004		4.918	.035	
218	.850			398.089		6.967	.020	CLUSTER C - SEE FIG. 22
219	A			A		A	.020	SEE FIG. A
220							.020	
221		• •					.020	
222							.020	
223	\downarrow			\rightarrow		▼	.620	
224	.850			398.089		6.967	.020	₩
225	.400	.050	1015.114	187.336	13.599	3.278	. 025	WING TOP SURFACE
226	A	.200	1090.428	A	14.918	A	. 024	A
227	•	.600	1291.171			lacksquare	.633	
228	.400	.950	1466.875	187.336		3.278	.03/	ELEVON
229	.600	.050	1134.886	281.004	15.696	4.918	.032	
230	.600	.200	1188.657	<u></u>	16.637	A	.63/	
231	.600	.600	1332.028		19.146		.03/	
232		.800	1404.000		20.404		.032	ELEVON
233	<u> </u>	.900	1440.000	₩	21.034	<u> </u>	.034	A
234	.600	.950	1458.000	281.004	21.349	4.918	.033	•
235	.800	.050	1223.057	374.672	17.239	6.557	.033	
236		.200	1260.257	†	17.889	_	.033	
237		.600	1359.514		19.627		.032	
238		.800	1408.780		20.488		-030	ELEVON
239		.900	1433.690	<u>L</u> ▼	20.924	+	.030	ELEVON
240	.800	•950	1446.145	374.672	21.192	6.557	.030	ELEVON 🔻

Table IV (Continued) ...
Orbiter

7/C X NO. T	x ₀	JLL SC	Z	×(FROM)	ODEL SCA	T	↓ .	SKIN		
241 .829		У	Z			1	1 1	# ** - * · ·		
	1307		 		У	Z	φ	THICK-	REMARKS	S
	1307	ļ	1	(110327		<u> </u>	 	NESS	<u> </u>	
2421 000		<u> </u>		18.715]]			.026	BOTTOM CREA	SE
242.900	1399.2	1		20.318				.035	BOTTOM CRE	ASE
243 .975	1496.0	4		22.011			<u> </u>	. 030	OF OMS BOTTOM CREAS OF OMS	5E
2441.00	1528.3	<u> </u>		22.575			1	.034	BOTTOM OF RO	
245 1.014	1547.0			22.902			1		BOTTOM OF RO	
246 .780	1245	95.0	474.0	17.608	1.662	8.295	127.		OMS PODS	
247 .805	1276	112.9	474.0	18.173	1.976	8.295	123.8	.03/	1	
248 .829	1307	124.5	474.0	18.715	2.179	8.295		.63/		
249 .862	1350	132.6	_	19.460	2.320	8.295	119.1	T		
250 .963	1480	142.5		21.740	2.494	8.295	117.5		 	
251 1.00			*	22.575	2.494	8.295		, 033		
252 1.01/	1547.0		474.0	22.902		8.295		.033		
253 .805	1276	105.5	488	18.173	1.846	8.540	129.5			
254 .829	1307	117.0	498.7	18.715	2.048	8.727	130.0	-033		
255 .862	1350	126.5	506	19.460	2.214	8.855	130.0			
256 . 963	1480	134.5	513	21.740	2.354	8.978	130.0			
257 1.000	 		500	22.575		8.750		.03/		
258 1.014	1547.0		500	22.902		8.750		.032		
259 .805	1276	95.0	494.3	18.173	1.662	8.650	135.0			
260 .829	1307	95.0	511.0	18.715	1.662	8.942	139.0	. 034		\dashv
261 .862	1350	95.0	521.0	19.460	1.662	9.118	142.1	.03/		
262 . 963	1480	95.0	530.0	21.740	1.662			.027		
263 .862	1350	65	517.5	19.460	1.138		151.2	.03/	+	
264 • 963	14,00	65	527.0	21.740	1.138	9.222	153	- (OMS PODS	\dashv

Table IV (CONCLUDED) · Orbiter

			FULL S	CALE	MODEL	SCALE		
T/C NO.	b _v	X C	×o	Z	x (FROM) NOSE)	Z	SKIN THICKNESS	REMARKS
265	.159	.100	1353.00	550.20	19.513	9.628	, 030	VERTICAL TAIL
266	1	.300	1,01.51	550.20	20.361	9.628	.030	A
267		.700	1498.66	550.20	22.062	9.628	.028	
268	.299	0.00		594.40		0.402	- 033	L.E.
269	A	.100	1394.94	<u> </u>	20.246	<u> </u>	. 03/	
270		.300	1439.00		21.018		.03/	
271		.500	1483.06		21.789		.03/	
272	•	.700	1527.11	▼	22.559	*	.022	
273	.299	.900	1571.17	594.40	23.330	10.402	.022	
274	.532	0.00		667.96		11.689	.034	L.E.
275	A	.100	1538.31	A	22.755		.03/	
276		.300	1574.94		23,396		.032	
277		.500	1611.57		35.034		.032	
278	•	.700	1648.14	▼	24.677	▼	.023	
279	.532	•900	1684.77	667.96	25.318	11.689	.076	
280	.765	0.00		741.53		12.977	.034	L.E.
281	.765	.100	1461.00		21.403	A	.03/	
282	A	.300	1490.14		21.912		.03/	
283		.500	1519.29		22.423		-030	
. 284	•	.700	1548.43	₩	22.933		.024	
285	.765	.900	1577.57	741.53	23.442	12.977	.024	
		0.00		785.73		13.750	.033	L.E.
287	.905	.100	1576.49	785.73	23.424	13.750	.030	\
288	•905	.500	1625.86	785.73	24.288	13.750	.030	VERTICAL TAIL

Table V Orbiter Left Main NOzzle T/C Locations Model 22-OTS

T/C	x FROM E	XIT PLANE	φ _n cloc	KWISE LOOKING FORWARD
NO.	F.S.	M.S.	SKIN THCKNESS	0° BOTTOM €
301	5"	0.088	.031	00
302			.03/	25 ⁰
303	·		.03/	45 ⁰
304			.03/	65 ⁰
305			.03/	90°
306			.03/	1350
307	•	V	.03/	315 ⁰
308	10"	0.175	-03/	00
309		1	.63/	25 ⁰
310			.03/	45 ⁰
311			.03/	65 ⁰
312		V	.03/	90°
313	15"	0.263	.03/	00
314			.03/	45 ⁰
315		*	.031	900
316	25"	. 0.438	.03/	00
317			.03/	45 ⁰
318			-03/	65 ⁰
319		Ť	.03/	900
320	45"	0.788	.03/	45 ⁰
321			.032	BASE PLATE
322			.034	
323			.03/	
324			.032	-

Table VI Solid Rocket Booster T/C Locations Model 22-OTS

T/C NO.	x _s FS	x ms	X L	Ψ	SKIN THICKNESS	REMARKS
701	200.000	0.000	0.000	90 ⁰	.022	NOSE
702	241.900	0.733	0.025	900	.03/	
703	283.800	1.467	0.050	90 ⁰	.03/	
704	367.600	2.933	0.100	900	.033	V
705	870.400	11.732	0.400	90°	.029	·
706	1373.200	20.531	0.700	90°	.030	
707	1507.280	22.877	0.780	90 ⁰	.030	
708	1540.800	23.464	0.800	90 ⁰	.029	
709	1708.400	26.397	0.900	90 ⁰	.03/	
710	1758.680	27.277	0.930	90°	.034	
711	1859.240	29.037	0,990	90°	.036	
712	1373.200	20.531	0.700	135 ⁰	.030	
713	1708.400	26.397	0.900	135 ^Q	.030	
714	1758.680	27.277	0.930	135 ⁰	.034	
715	1859.240	29.037	0.990	135 ⁰	.035	
716	283.800	1.467	0.050	180 ⁰	.032	
717	367.600	2.933	0.100	180 ⁰	.034	
718	535.200	5.866	0.200	180 ⁰	.030	
719	870.400	11.732	0.400	180 ⁰	.030	
720	1038.000	14.665	0.500	180°	.029	
721	1205.600	17.598	0.600	180 ⁰	.030	
722	1289.400	19.065	0.650	180 ⁰	.030	•
723	1373.200	20.531	0.700	180 ⁰	.029	
724	1457.000	21.998	0.750	180 ⁰	.029	
725	1507.280	22.877	0.780	180 ⁰	.030	
726	1540.800	23.464	0.800	180 ⁰	.028	
727	1624.600	24.931	0.850	180 ⁰	.028	
728	1708.400	26.397	0.900	180 ⁰ .	.0 28	
729	1758.680	27.277		180 ⁰	.032	SKIRT
730	1808.960	28.157		180 ⁰	.034	SKIRT
731	1859.240	29.037		180 ⁰	.034	SKIRT
732	1715.000	26.514		210 ⁰	.028	SEPARATION
733	1738.000	26.984		210 ⁰	.030	NOZZLES 15-5PH

Table VI (Continued) (Solid Rocket Booster

- 40	(Solid Rocket Booster)						
T/C NO.	x _s FS	x [*] ms	X L	Ψ	SKIN THICKNESS	REMARKS	
734	1750.000	27.130	0.925	210 ⁰	.032	SEPARATION	
735	1792.200	27.864	0.950	210°	.033	NOZZLES 15-5PH	
736	1825.720	28.450	0.970	210°	.032	27-7111	
737	1750.300	27.130	0.925	≈ 215 ⁰	.032		
738	1775.440	27.570	0.940	≈215 ⁰	.032		
739	1808.960	28.157	0.960	≈ 215 ⁰	.033		
740	325.700	2.200	0.075	2250	.035		
741	367.600	2.933	0.100	225 ⁰	.034		
742	451.400	4.400	0.150	225 ⁰	.032		
743	535.200	5.866	0.200	225 ⁰	.0 30		
744	702.800	8.799	0.300	225 ⁰	.028		
745	870.400	11.732	0.400	225 ⁰	,0 30		
746	1038.000	14.665	0.500	225 ⁰	.0 30		
747	1205.600	17.598	0.600	225 ⁰	.030		
748	1373.200	20.531	0.700	225 ⁰	.030		
749	1507.280	22.877	0.780	225 ⁰	.030		
750	1540.800	23.464	0.800	225 ⁰	.029		
751	1624.600	24.931	0.850	225 ⁰	.029		
752	1708.400	26.397	0.900	225 ⁰	.027		
753	1758.680	27.277	0.930	225 ⁰	.03/	SKIRT	
754	1808.960	28.157	0.960	225 ⁰	.032		
755	1859.240	29.037	0.990	225 ⁰	.032		
756	1758.68	27.277	0.930	240 ⁰	,030		
757	1808.960	28.157	0.960	240 ⁰	.031		
758	1859.240	29.037	0.990	240 ⁰	.032	V	
759	702.800	8.799	0.300	247.5 ⁰	.028		
760	870,400	11.732	0.400	247.5 ⁰	.030		
761	1038.000	14.665	0.500	247.5 ⁰	.030		
762	1205.600	17.598	0.600	247.5 ⁰	.030		
763	1289.400	19.065	0.650	247.5 ⁰	.0.31		
764	1373.200	20.531	0.700	247.5 ⁰	,030		
765	1457.000	21.998	0.750	247.5 ⁰	.03/		
766	392.74%	3.373	0.115	260 ⁰	1032		
+ME AC	MRED FORM N	1000					

Table VI (Concluded)
(Solid Rocket Booster)

T/C NO.	x _s FS	* × ms	X L	*	SKIN THICKNESS	REMARKS
767	203.816	0.067	0.002	270 ⁰	.035	ON 45° RAY
768	241.900	0.733	0.025	270 ⁰	.633	FROM NOSE T
769	283.800	1.467	0.050	270 ⁰	.033	
770	325.700	2.200	0.075	270 ⁰	.036	
771	367.600	2.933	0.100	270 ⁰	.036	
772	384.360	3.226	0.110	270 ⁰	.036	
773	417.880	3.813	0.130	270 ⁰	.032	•
774	451.400	4.400	0.150	270 ⁰	.032	
7.75	535.200	5.866	0.200	270 ⁰	.030	
776	619.000	7.333	0.250	270 ⁰	.030	
777	702.800	8.799	0.300	270 ⁰	.028	
778	870.400	11.732	0.400	270 ⁰	.029	
779	1038.000	14.665	0.500	270 ⁰	.030	
780	1205.600	17.598	0.600	270 ⁰	.03/	
781	1289.400	19.065	0.650	270 ⁰	-03/	
782	1373.200	20.531	0.700	270 ⁰	• 630	
783	1457.000	21.998	0.750	270 ⁰	. 030	
784	1507.280	22.877	0.780	270 ⁰	.030	
785	1540.800	23.464	0.800	270 ⁰	. 030	
786	1624.600	24.931	0.850	270 ⁰	-030	
787	1708.400	26.397	0.900	270 ⁰	.027	
788	1758.680	27.277	0.930	270 ⁰	-029	SKIRT
789	1808.960	28.157	0.960	270 ⁰	.032	
790	1859.240	29.037	0.990	270 ⁰	.032	Y
791	70 2.800	8.799	0.300	315 ⁰	.029	
792	1038.000	14.665	0.500	315 ⁰	, 030	
793	1373.2000	20.531	0.700	315 ⁰	.029	
794	1507.2 80	22.877	0.780	315 ⁰	.028	
795	1540.800	23.464	0.800	315 ⁰	.028	
796	1708.400	26.397	0.900	315 ⁰	.028	
797	1758.680	27.277	0.930	315 ⁰	.030	
798	1859.240	29.037	0 990	315 ⁰	.032	

Table WII External Tank Locations

			Cycelliai Jank		_	
T/C NO.	x _T FS	×ms	X L	θ	SKIN THICKNESS	REMARKS
501	383.60	1.306	.040	0°	.034	NOSE
502	458.20	2.6110	.080		.034	NOSE
503	588.75	4.896	.150		.035	NOSE
504	1055.00	13.055	.400		.035	
505	1428.00	19.582	.600	\	.034	
506	1801.00	26.110	.800	00	.035	
507	1055.00	13.055	.400	45°	.035	
508	1241.50	16.319	.500	4	.035	
509	1428.00	19.582	.600		.034	
510	1614.50	22.846	.700		.034	
511	1801.00	26.110	.800	V	.035	
512	1987.5	29.374	.900	45 ⁰	A	
513	868.5	9.791	.300	67.5°		
514	961.7 5	11.423	.350			
515	1055.00	13.055	.400		.035	
516	1241.50	16.319	.500		.034	
517	1428.00	19.582	.600		1	
518	1521.25	21.214	.650		-	
519	1614.50	22.846	.700	1-1-1	.034	
520	1707.75	24.478	.750	t	.035	
521	1801.00	26.110	.800		<u> </u>	
522	1987.5	29.374	.900	67.5°		•
523	682.00	6.528	.200	90°		
524	775.25	8.159	.250			
525	821.88	8.975	.275			
526	868.50	9.791	.300			
527	915.12	10.607	.325		+ +	
528	961.75	11.423	.350		.035	
529	1055.00	13.055	-400		.034	
530	1148.25	14.687	.450		.035	
531	1241.5	16.319	.500		.034	
532	1334.75	17.951	.550	-+	.035	
533	1428.00	30.500	.600	90°	.034	

Table VII(Continued) (External Tank)

T/C NO.	x _T FS	×ms	X L	al Tank)	SKIN THICKNESS	REMARKS
534	1521.25	21.214	.650	900	.034	
535	1614.50	22.846	.700	1	.034	
536	1707.75	24.478	.750		.035	
537	1801.00	26.110	.800		.035	
538	1894.25	27.742	.850	V	.034	
539	1987.50	29.374	.900	90°		
540	821.88	8.975	.275	112.5°	.035	
541	368.50	9.791	.300	4	4	
542	915.12	10.607	.325			
543	961.75	11.423	.350			
544	1055.00	13.055	.400		+	
545	1148.25	14.687	.450		.035	
546	1241.50	16.319	.500		.034	
547	1334.75	17.951	.550		.035	
548	1428.00	19.582	.600		.034	
549	1521.25	21.214	.650		.034	
550	1614.50	22.846	.700		.034	·
551	1707.75	24.478	.750		.035	
552	1801.00	26.110	.800		4	
553	1894.25	27.742	.850	†	†	
554	1987.50	29.374	.900	112.50	.035	
555	1847.62	26.926	.825	123°	.034	
556	1894.25	27.742	.850	A	.035	
557	1940.88	28.558	.875		.034	
558	1987.50	29.374	.900		.035	
559	2034.12	30.190	.925	*	.035	
560	2099.40	31.332	.960	123°	.034	
561	915.12	10.607	.325	135°	.035	
562	961.75	11.423	.350	14		
563	1008.38	12.239	.375			
564	1055.00	13.055	.400		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
565	1148.25	14.687	.450		.035	
566	1241.50	16.319	.500		.034	
567	1334.75	17.951	.550		.035	
568	1428.00	19.582	.600	*	.034	
569	1521.25	21.214	.650	135°	.034	
	SHDED -EDOM	1				

Table VII (Continued)
(External Tank)

(External Tank)							
T/C NO.	x _T FS	×ms	X L	8	SKIN THICKNESS	REMARKS	
570	1614.50	22.846	.700	135°	.035		
571	1707.75	24.478	.750	A	.034		
572	1801.00	26.110	.800		.035		
573	1894.25	27.742	.850		.034	-	
574	1987.50	29.374	.900	<u> </u>	.035		
575	2052.78	30.576	.935	135°			
576	1055.00	13.055	.400	151	.035		
577	1101.62	13.871	.425	157	4		
578	1148.25	14.687	.450	_ _ _ _			
579	1194.88	15.503	.475		.035		
580	1241.50	16.319	.500		.034		
581	1334.75	17.951	.550		.035		
582	1428.00	19.582	.600		.034		
583	1521.25	21.214	.650		.034		
584	1614.50	22.846	.700		.035		
585	1707.75	24.478	.750		.035		
586	1801.00	26.110	.800		.035		
587	1894.25	27.742	.850	Y	.034		
588	1987.50	29.374	.900	157	.034		
589	1101.62	13.871	.425	161	.035		
590	1241.50	16.319	.500	165°	.034		
591	1614.50	22.846	.700	165°	.035		
592	1987.50	29.374	.900	165°	.034		
593	1055.00	13.055	.400	16 5°	1.035		
594	309.00	0.000	0.000	180	1.033	NOSE	
595	318.32	0.163	.005	A	.033		
596	327.65	0.326	.010		.034		
597	383.60	1.306	.040	1	.033	-	
598	458.20	2,611	.080	180°	.035	Ť	

^{*}MEASURED FROM NOSE

Table VII (CONTINUED (External Tank)

T/C NO.	x _T FS	× x ms	<u>×</u> L	θ	SKIN THICKNESS	REMARKS
599	. 588.75	4.896	.150	180°	.035	
600	682.00	6.528	.200		.034	
601	775.25	8.159	.250		.035	
602	868.50	9.791	.300		A	
603·	961.75	11. 423	.350		*	
604	1008.38	12.239	.375		.035	
605	1055.00	13.055	.400		.034	
606	1101.62	13.871	.425		A	
607	1148.25	14.687	.450			
608	1194.88	15,503	. 475		Ť	
609	1241.50	16.319	.500		.034	
610	1288.12	17.135	.525		.035	
611	1334.75	17.951	.550		.035	
612	1381.38	18.767	.575		.034	
613	1428.00	19.582	.600		A	
614	1474.62	20.398	.625			
615	1521.25	21.214	.650			
616	1567.88	22.030	.675		†	
617	1614.50	22.846	.700		.034	
618	1707.75	24.478	.750		.035	
619	1801.00	26.110	.800		.035	
620	1894.25	27.742	.850		.035	
621	1987.5	29.374	.900		.034	
622	2056. 50	30.581	937	*	.034	
623	2127.38	31.822	.975	180°	.034	
624	458.20	2.611	.080	194°	.035	
625	587.75	4.896	.150	196°	.035	
626	868. 50	9.791	.300	196°	.035	

^{*}MEASURED FROM NOSE

Table VII (Concluded)

(External Tank)

			ACELHAI	Tank)		
T/C NO.	x _T FS	× [*] ms	<u>X</u>	θ	SKIN THICKNESS	REMARKS
627	1241.50	16.319	.500	196°	.034	
628	1614.50	22.846	.700	196°	.034	
629	1987.50	29.374	.900	197°	.034	
630	588.75	4.896	.150	208°	.033	
631	1055.00	13.055	.400	A	.034	
632	1428.00	19.582	.600	1-1	.035	·
633	1801.00	26.110	.800	T	.035	
634	2056.50	30.581		208	.035	
635	1055.00	13.055	.400	216°	.034	
636	1241.50	16.319	.500	216°	.034	•
637	1614.50	22.846	.700	216°	.034	
638	933.78	10.934	.335	222.5°	.036	
639	1055.00	13.055	.400	229°	.034	
640	1428.00	19.582	.600	229°	.035	
641	1801.00	26.110	.800	229°	.035	

^{*}MEASURED FROM NOSE

TABLE VIII
Thermocouple Schedule No. X1

Thermocouple No.	Channe l	Thermocouple No.	Channe]	Thermocouple No.	Channel
1 2 3 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	48 50 52 54 56 58 59 60 61 62 63 64 65 66 67 68 69 71 72 74 79 84 87 88	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48	91 92 93 94 95 96 97 98 99 100 101 102 104 105 111 115 116 134 135 150 155 156 157	51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 67 68 69 70 71 72 73
46	25	90	49 50	158 159	74 75

TABLE VIII
Thermocouple Schedule No. X2

Thermocouple No.	Channe 1	Thermocouple No.	Channe 1	Thermocouple No.	Channel
160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	187 188 189 190 191 192 193 196 197 198 199 200 201 202 203 204 205 204 205 206 207 208 209 210 211 212 213	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	214 215 216 218 219 220 221 222 229 230 232 234 246 247 274 275 276 277 278 279 280 281 282 283 284	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 68 69 70 71 72 73 74 75

TABLE VIII
Thermocouple Schedule No. X3

Thermocouple No.	Channe 1	Thermocouple No.	Channe 1	Thermocouple No.	Channel
5 7 9 11 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	57 70 73 75 76 77 78 80 81 82 83 85 86 89 103 106 107 108 109 110 112 113 114 117	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 136 137 138 139 140 141 142 143 144 145	51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 70 71 72 73 74 75

TABLE VIII
Thermocouple Schedule No. X4

Thermocouple No.	Channel	Thermocouple No.	Channel	Thermocouple No.	Channel
146	1	239 240 241 242 243 244 245 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265	26	266	51
147	2		27	267	52
148	3		28	268	53
149	4		29	269	54
151	5		30	270	55
152	6		31	271	56
153	7		32	272	57
154	8		33	273	58
185	9		34	286	59
186	10		35	287	60
194	11		36	501	61
195	12		37	502	62
217	13		38	503	63
223	14		39	504	64
224	15		40	505	65
225	16		41	506	66
226	17		42	507	67
227	18		43	508	68
228	19		44	509	69
231	20		45	510	70
233	21		46	511	71
235	22		47	512	72
236	23		48	513	73
237	24		49	514	74
238	25		50	515	75

TABLE VIII
Thermocouple Schedule No. X5

Thermocouple No.	Channel	Thermocouple No.	Channel	Thermocouple No.	Channel
516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 532 533 534 535 536 537 538 539 540	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	541 542 543 544 545 546 547 548 549 551 552 553 554 555 556 561 562 563 564 565	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75

TABLE VIII
Thermocouple Schedule No. X6

Thermocouple No.	Channel	Thermocouple No.	Channel	Thermocouple No.	Channel
591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	No. 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 706 707	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47		51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72
613 614 615	23 24 25	71 3 744 749	48 49 50	717 718 719	73 74 75

TABLE VIII
Thermocouple Schedule No. X7

720 1 753 26 784	51
721 2 754 27 785	52
722 3 755 28 787	53
723 4 756 29 788	54
723 4 756 29 788 724 5 757 30 789 725 6 758 31 790 726 7 760 32 791 728 8 762 33 793 729 9 766 34 797 730 10 767 35 798 731 11 768 36 712 732 12 769 37 727 733 13 770 38 746 734 14 771 39 748 735 15 772 40 750 736 16 773 41 751 737 17 774 42 761 738 18 775 43 763 740 20 777 45 765 741 21 778 46 780 742 22 779 47 786 743 </td <td>55 56 57 58 59 60 61 62 63 64 65 66 67 71 72 73 74</td>	55 56 57 58 59 60 61 62 63 64 65 66 67 71 72 73 74

TABLE VIII
Thermocouple Schedule No. x8

Thermocouple No.	Channe 1	Thermocouple No.	Channe1	Thermocouple No.	Channel
501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575	51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 67 68 69 71 72 73 74 75

TABLE VIII
Thermocouple Schedule No. x9

Thermocouple No.	Channel	Thermocouple No.	Channel	Thermocouple No.	Channel
576 577 578 579 580 581 582 583 584 585 586 587 588 590 591 592 593 594 595 596 597 598 599 600	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 620 621 622 623 624 625	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 Open Open Open Open Open	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
000	25	623	ου	0pen	/5

TABLE VIII
Thermocouple Schedule No. X10

Thermocouple No.	Channel	Thermocouple No.	Channe 1	Thermocouple No.	Channel
701 702 703 704 705 708 709 710 711 714 715 716 717 718 719 720 721 722 723 724 725 726 728 729 730	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	731 732 733 734 735 736 737 738 739 740 741 742 743 745 747 753 754 755 756 757 758 760 762 766 767	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	768 769 770 771 772 773 774 775 776 777 778 779 781 782 783 784 785 787 788 789 790 791 793 797 798	51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 70 71 72 73 74 75

TABLE VIII
Thermocouple Schedule No. X11

Thermocouple No.	Channel	Thermocouple No.	Channe1	Thermocouple No.	Channel
37 39 41 43 45 47 49 51 53 Open Open 70 73 75 76 77 78 80 81 82 83 85 86 89	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	106 107 108 109 110 129 130 131 132 133 136 137 138 139 140 141 142 143 144 145 516 517 518 519	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49	521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 543	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
103	25	520	50	545	75

TABLE VIII
Thermocouple Schedule No. X12

Thermocouple No.	Channel	Thermocouple No.	Channel	Thermocouple No.	Channel
146 147 148 149 151 152 153 154 185 186 194 195 217 223 224 225 226 227 228 231 233 235 236 237 238	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	239 240 241 242 243 244 245 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	266 267 268 269 270 271 272 273 286 287 701 702 703 704 705 708 709 710 711 714 715 716 717 718 719	51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 70 71 72 73 74 75

TABLE VIII
Thermocouple Schedule No. X13

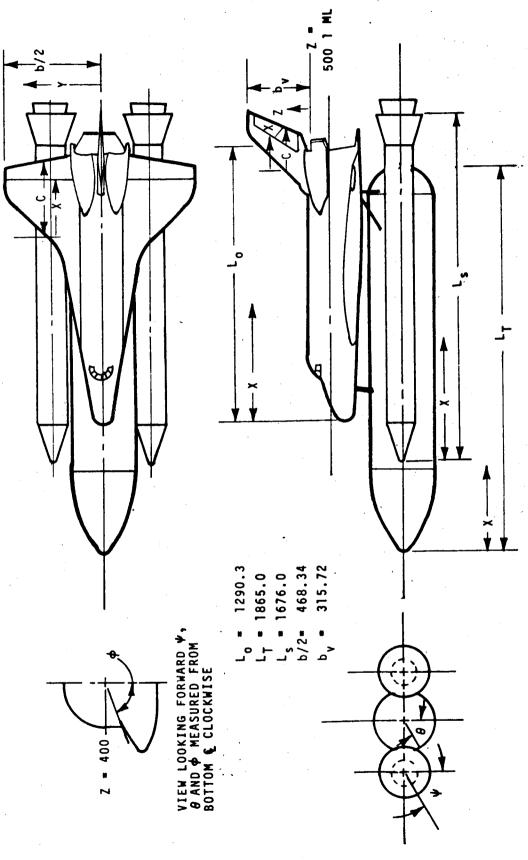
Thermocouple No.	Channel	Thermocouple No.	Channel	Thermocouple No.	Channel
546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 577 578 579 580 581 582 583 584	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49	611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
585	25	610	50	635	75

TABLE IX.
RUN NUMBER/TUNNEL CONDITION SUMMARY

Run #	Re _∞ /ft x 10 ⁶	PT (psi)	TT	HT
	X 10°	(h21)	(°R)	(BTU/1b _m)
3	1.4909	165.58	1581.2	200.00
3 5 7 8	1.4111	141.88	1487.5	390.90
7	1.3945	119.68	1348.1	366.19
8	1.4341	120.04	1327.2	329.90
9	1.4762	122.81	1322.1	324.51
10	1.4540	118.76	1306.9	323.19
11	1.4993	121.26	1298.8	319.30
12	4.7266	405.72	1348.2	317.22
13	5.0370	405.98	1340.2	329.94
14	4.9672	403.68	1296.0	316.50
15	4.9723	405.35	1302.8	318.23
16	4.9533		1305.4	318.89
17	5.0060	406.35	1310.5	320.21
18	5.0979	405.69	1300.5	317.64
19	1.4998	404.88	1284.1	313.43
20	1.5374	122.63	1307.7	319.50
21	1.5232	121.33	1278.9	312.11
22	1.4696	122.04	1291.2	315.26
23	1.6062	122.08	1320.8	322.87
24		119.90	1234.9	300.85
25	1.5275	122.10	1289.3	314.76
26	1.5757	119.48	1247.1	303.98
27	4.9504	405.67	1309.6	319.98
28	4.9770	406.03	1305.9	319.04
28 29	4.9574	405.59	1308.3	319.64
30	4.9770	406.32	1306.5	319.19
31	5.0055	406.22	1301.6	317.93
32	5.0063	406.42	1301.9	318.01
33	5.0389	406.71	1297.2	316.80
33 34	5.0961	405.17	1285.0	313.65
35	4.9856	405.20	1302.8	318.24
	5.0750	405.72	1289.4	314.80
36 27	5.0306	406.14	1297.4	316.85
37	5.1486	401.85	1270.1	309.85
38	5.0550	406.03	1293.2	315.78
39 40	5.0452	406.22	1295.2	316.28
40	1.6365	130.40	1286.8	314.12

TABLE IX. (Concluded)

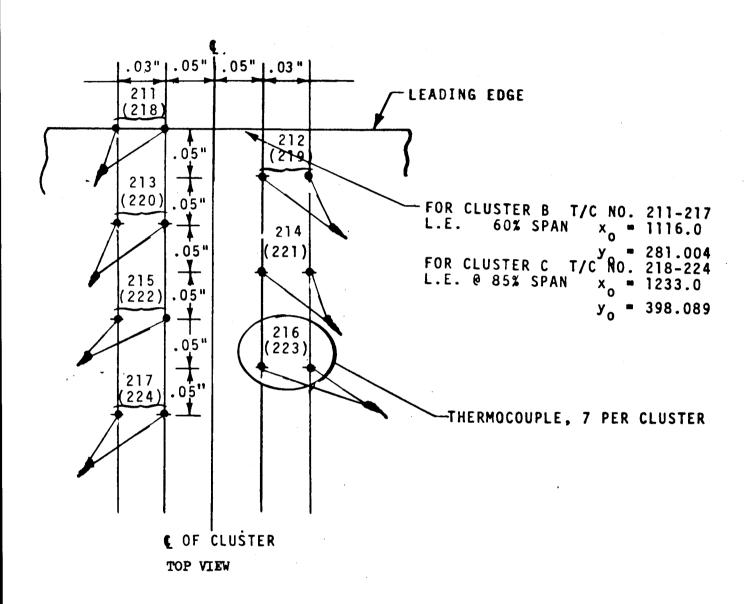
Run #	Re _∞ /ft <u>x 10</u> 6	PT (psi)	TT (°R)	HT (BTU/15 _m)
41	1.5819	126.58	1290.2	314.99
42	1.5224	122.73	1296.2	316.55
43	1.5160	123.06	1301.8	317.99
44	5.1123	406.40	1284.8	313.62
45	5.0361	406.22	1296.7	316.66
46	5.0028	405.88	1301.4	317.87
47	5.3924	404.93	1239.5	302.03
4 8	1.5328	123.06	1292.8	315.67
49	1.5263	122.69	1293.9	315.94
50	1.4308	118.69	1319.7	322.57
51	1.4952	121.64	1303.6	318.44
52	5.0533	405.46	1292.4	315.56
53	5.0265	406.40	1298.6	317.15
54	5.1372	405.09	1278.3	311.95
55	4.9871	402.92	1298.0	317.00
56	1.5132	121.59	1293.6	315.86
57	1.5033	121.59	1298.9	317.23
58	5.0864	405.30	1286.8	314.12
59	5.0929	405.30	1285.7	313.85
60	5.0577	405.30	1291.3	315.29
61	5.0730	405.64	1289.6	314.84
62	1.5553	137.52	1373.4	336.46
63	1.5070	123.06	1306.7	319.24
64	1.5093	122.73	1303.3	318.37
6 5	5.0737	406.22	1290.6	315.10
66	5.1122	406.32	1284.7	313.59
68	1.4966	120.98	1298.4	317.12
69	5.2179	406.16	1268.0	309.30
70	4.9056	407.29	1320.4	322.76
71	5.0011	406.76	1303.5	318.40
72	4.9871	403.86	1299.9	317.49
73	5.0038	405.88	1301.2	317.83
74 76	5.0508	406.74	1295.3	316.32
76	5.0175	406.92	1301.1	317.80
77 70	5.0556	410.46	1302.0	318.02
78 70	5.0607	406.58	1293.4	315.83
79	4.9699	406.92	1308.9	319.81



a. Model instrumentation reference system

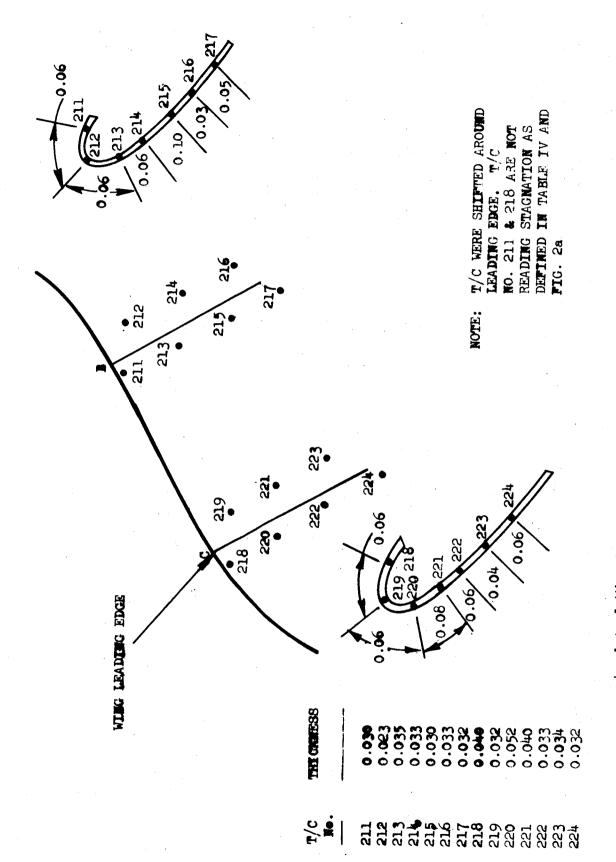
Figure 1. - Concluded.

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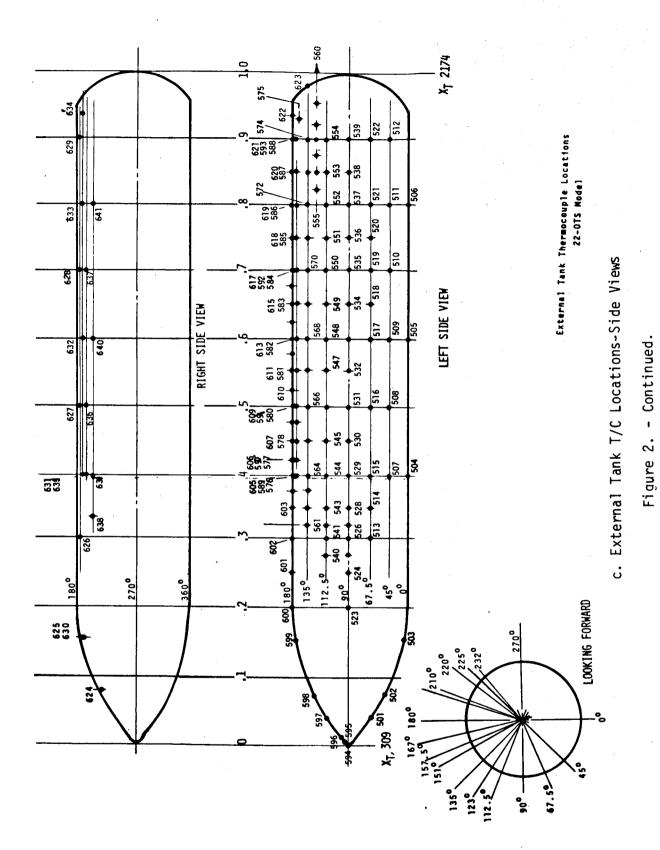
a. Assumed Plotted Wing Leading-Edge Clusters B & C T/C Locations, (Used for Plotted and Tabulated Data Presentations)

Figure 2. - Model instrumentation.

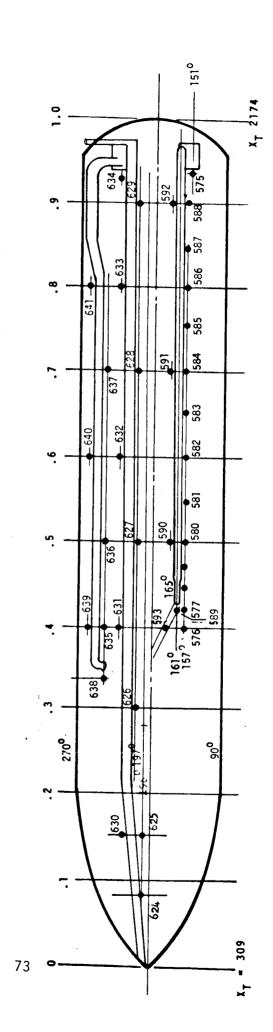


b. Actual Wing Leading Edge Clusters B & C T/C Locations and Skin Thickness (post Test Dimensional Check)

Figure 2. - Continued.



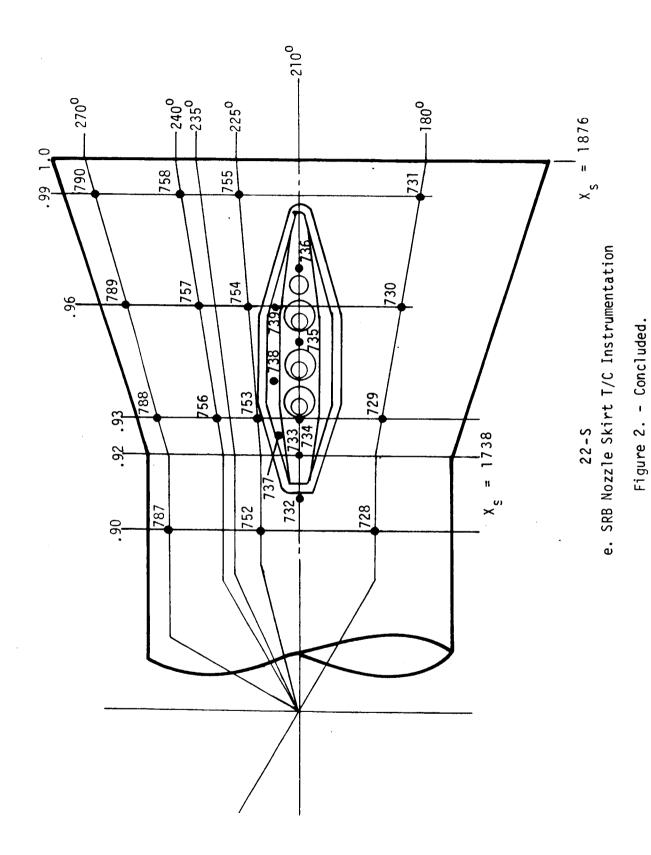
EXTERNAL TANK THERMOCOUPLE LOCATIONS (LOCATIONS AROUND PLUMBING ONLY) MODEL 22-0TS

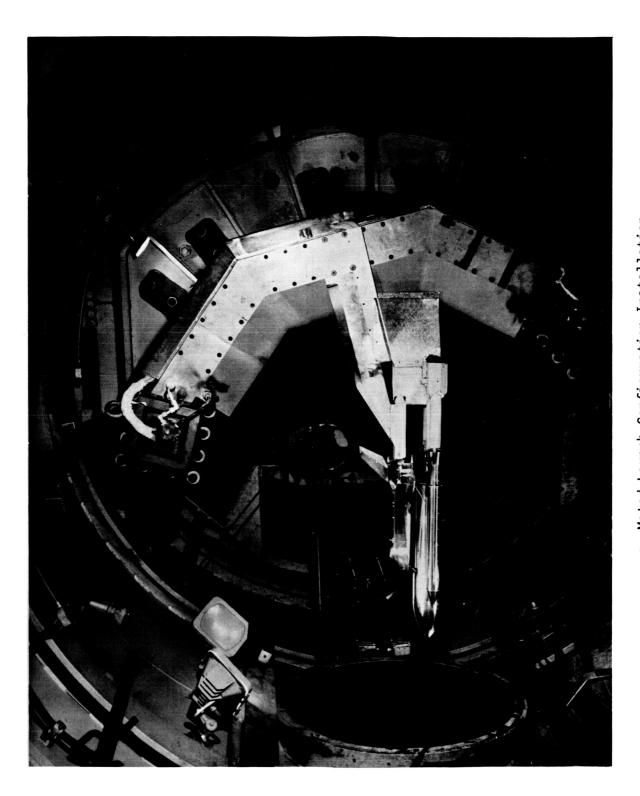


d. External Tank T/C Locations (Locations Around Plumbing Lines) Top View

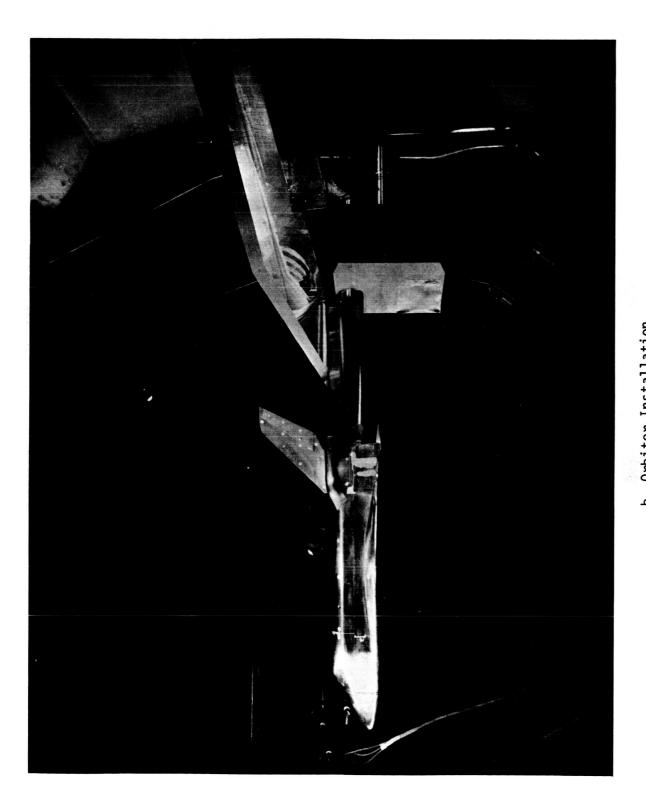
TOP VIEW

Figure 2. - Continued.

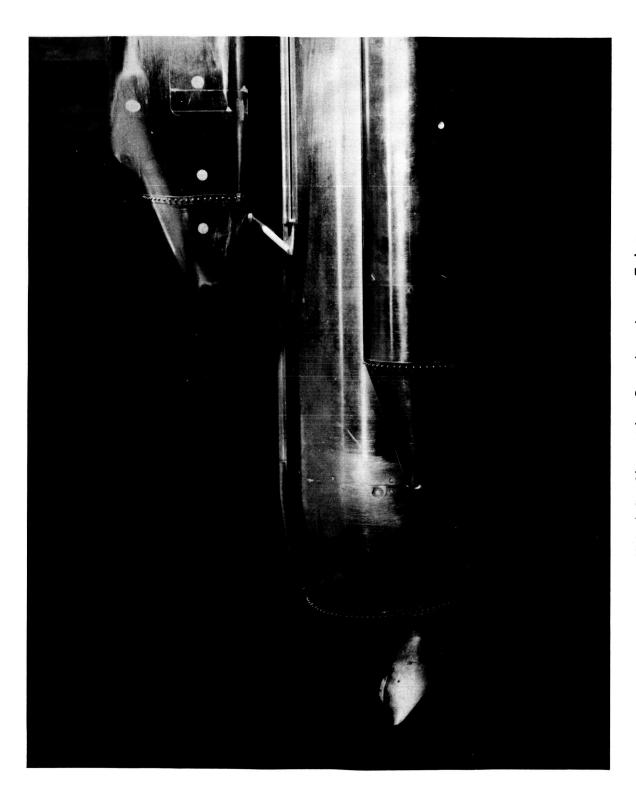




a. Mated Launch Configuration InstallationFigure 3. - Model photographs.



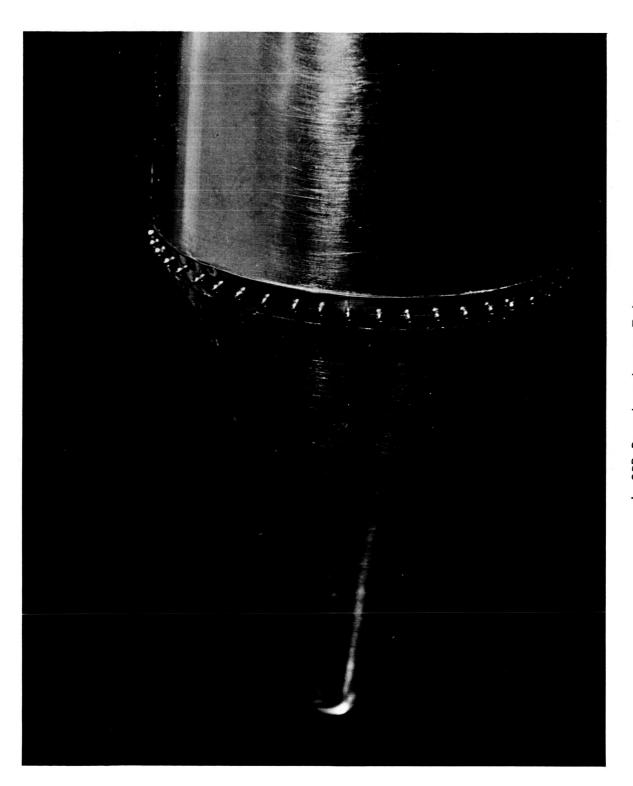
b. Orbiter InstallationFigure 3. - Continued.



c. Mated Configuration Boundary Layer Trips

Figure 3. - Continued.

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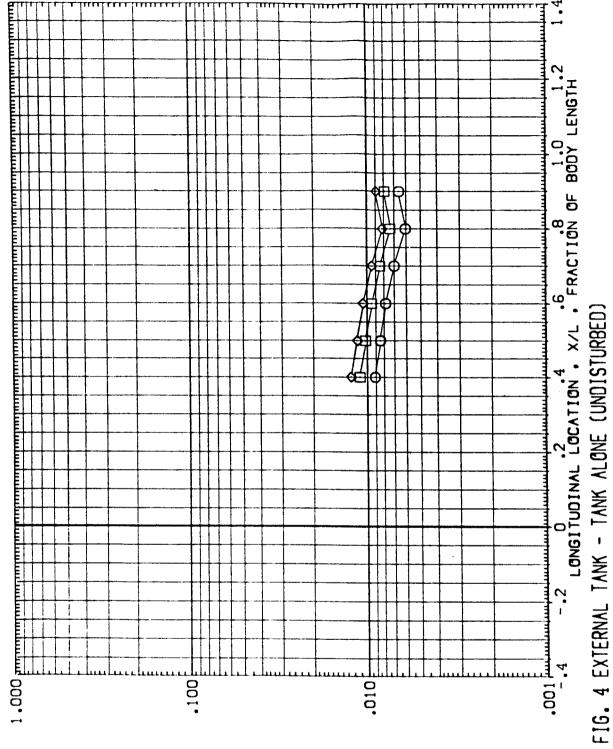


d. SRB Boundary Layer TripsFigure 3. - Concluded.

DATA FIGURES

EXTERNAL TANK DATA SRB DATA (SEE VOLUME II) ORBITER DATA (SEE VOLUME III)

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF





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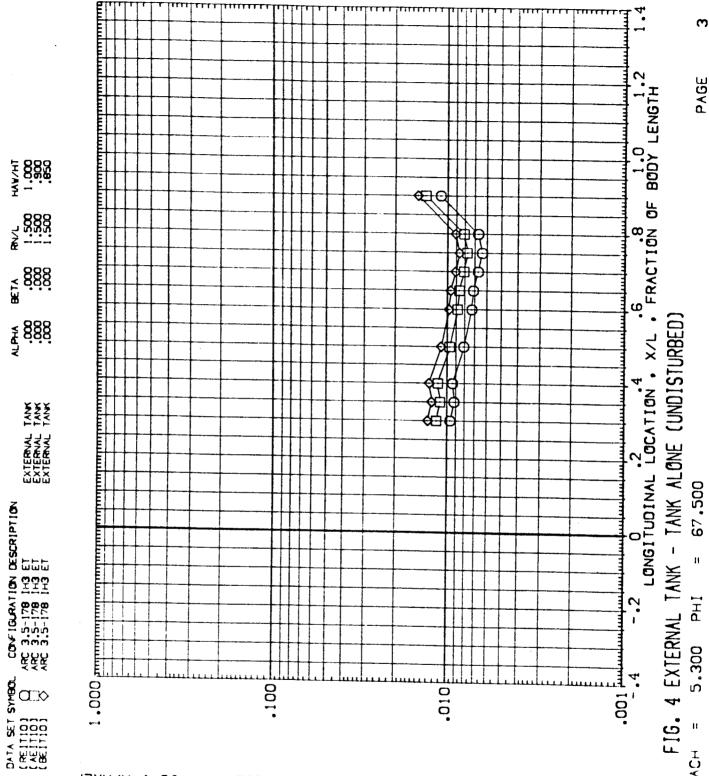
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1.0 1. BODY LENGTH 0 .2 .4 .6 .8 LONGITUDINAL LOCATION . X/L . FRACTION OF FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) -00. 4. 1.000 .100 010 (AE1110) (AE1110) (BE1110)

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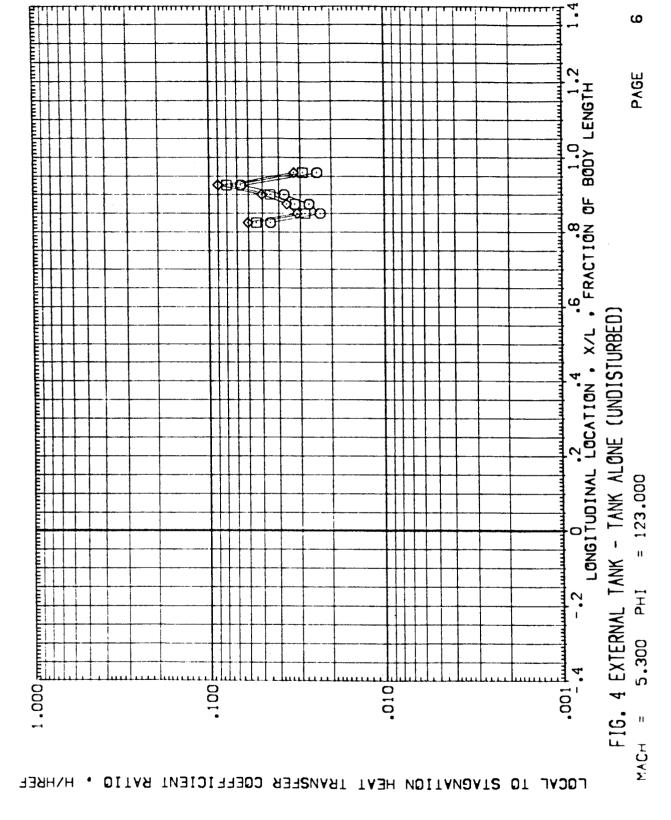
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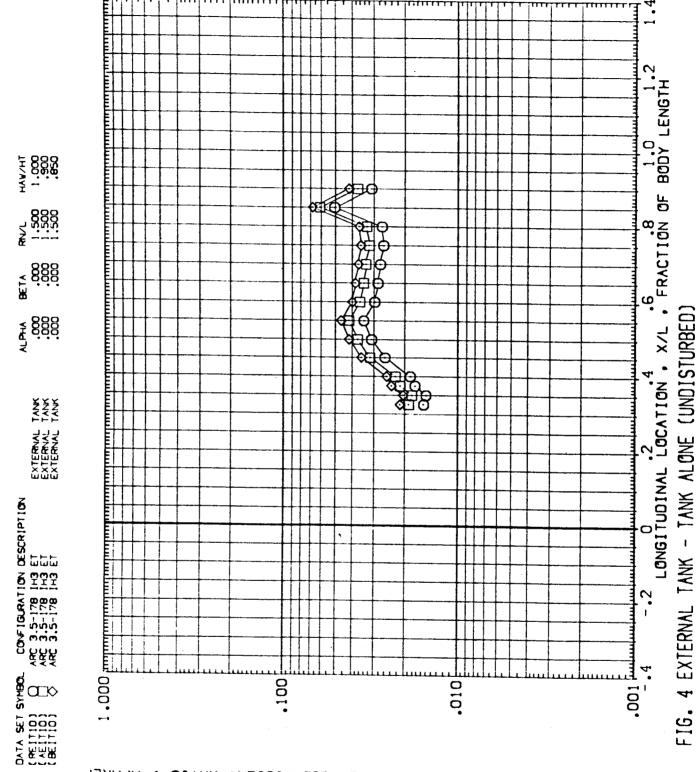




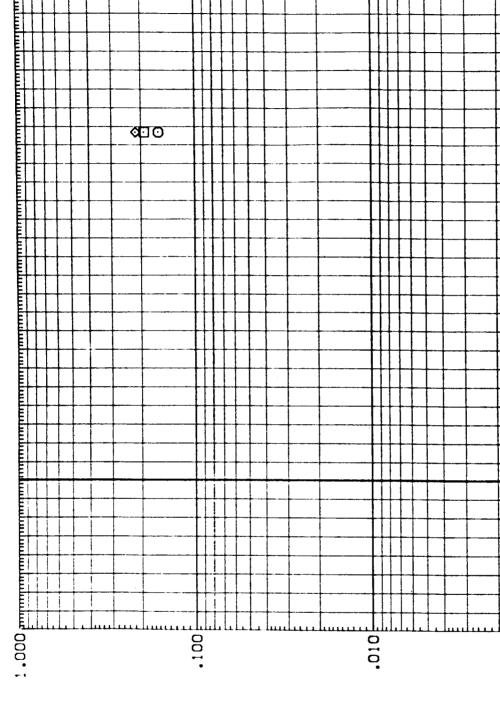
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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH

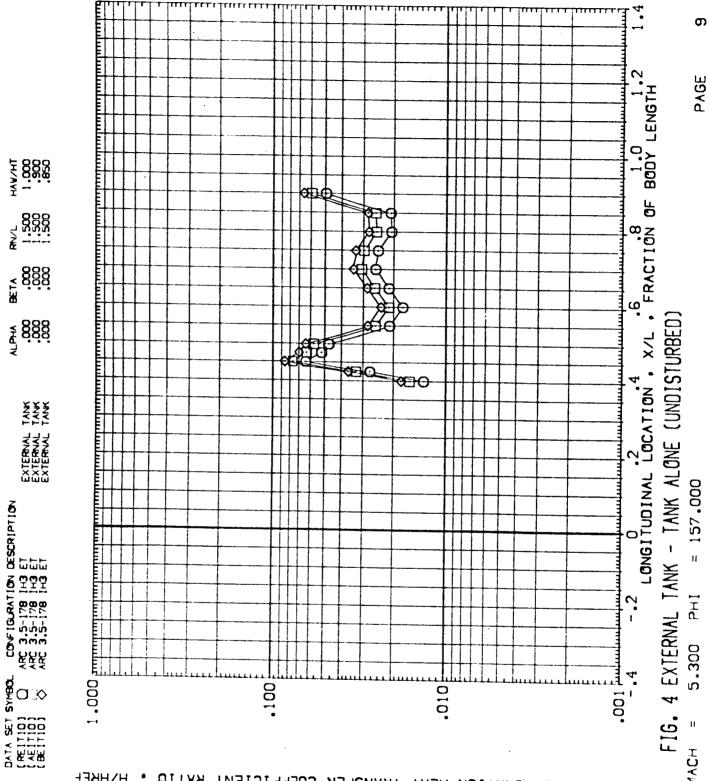
FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

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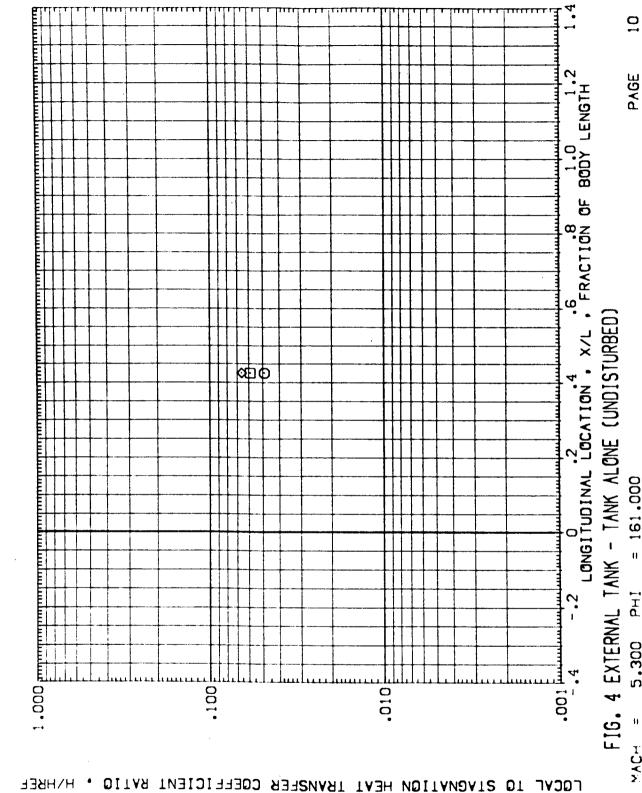
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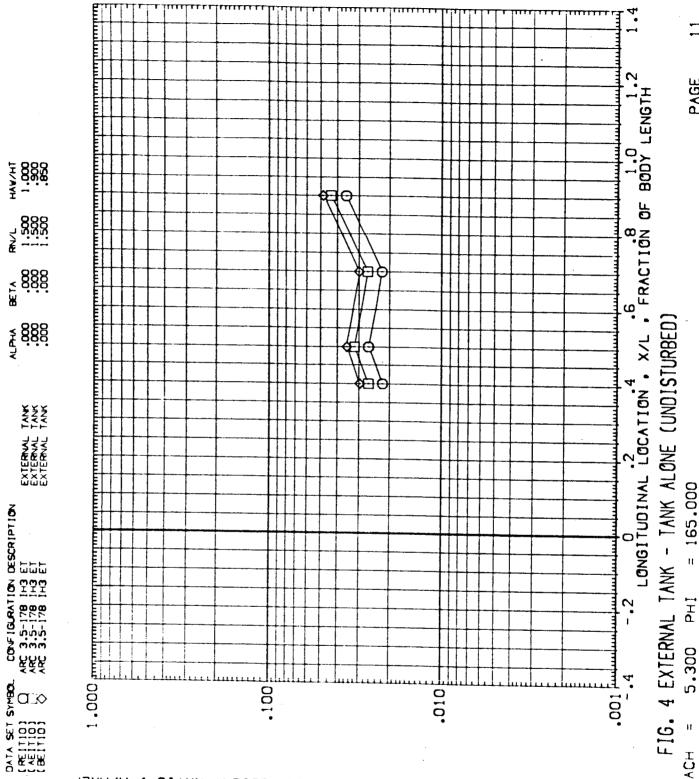


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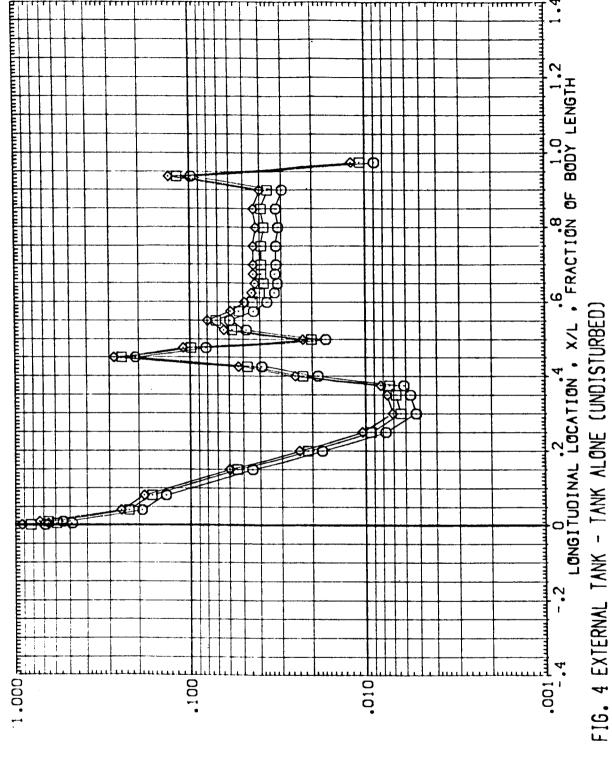
DATA SET ((RE1110) (AE1110) (BE1110)

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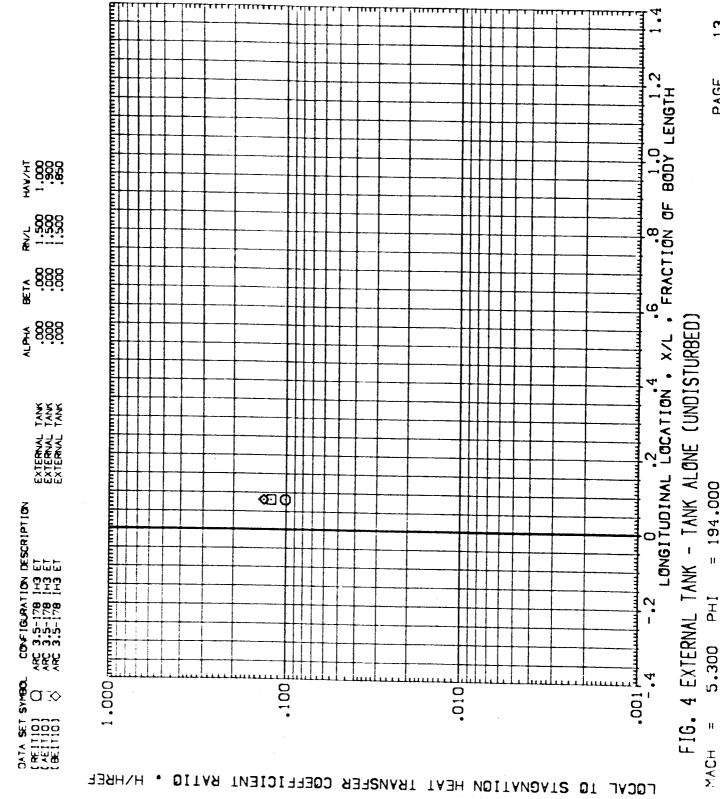
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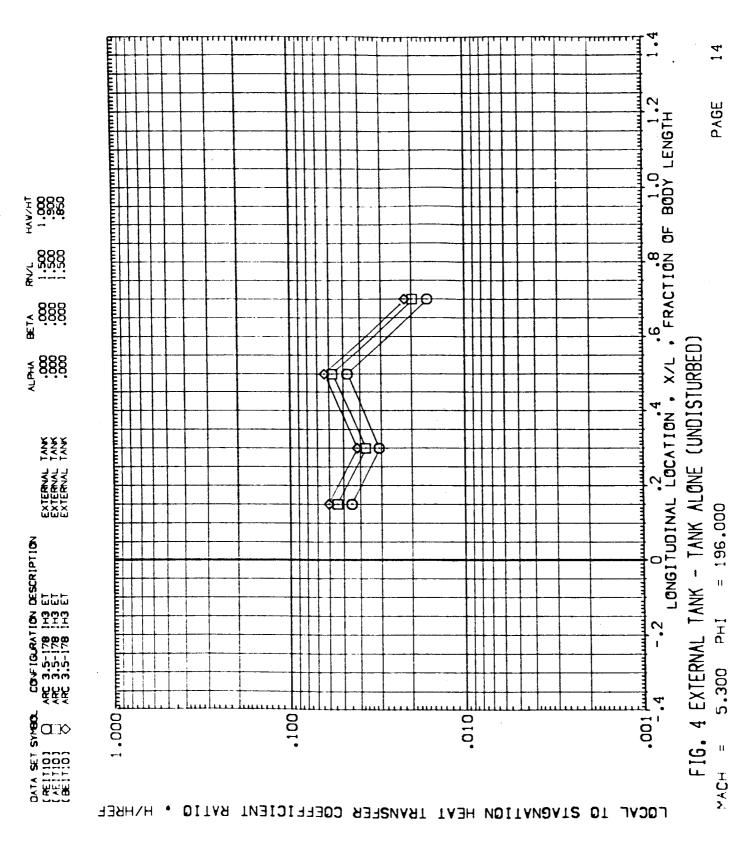


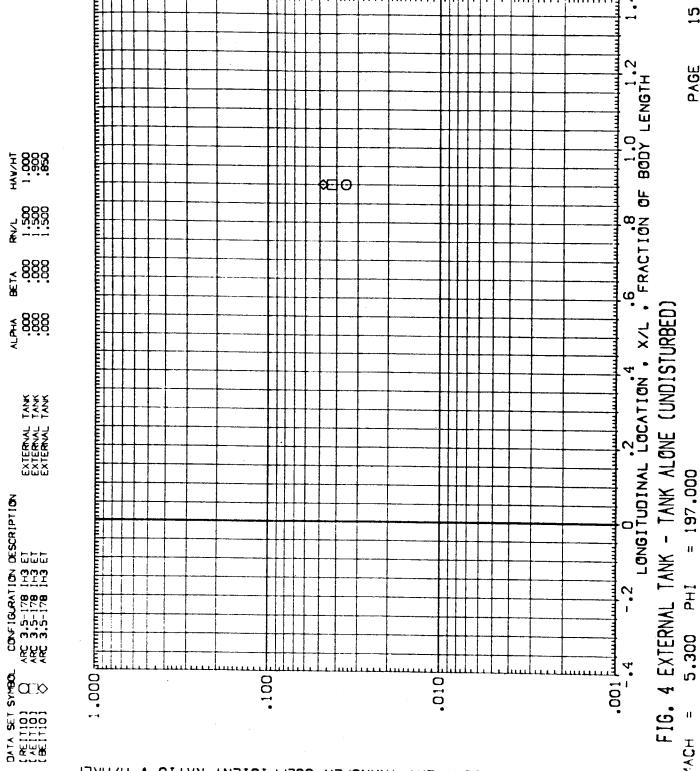
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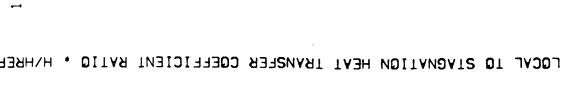


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LONGITUDINAL LOCATION , X/L , FRACTION OF BODY LENGTH FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) 1 • 000 grapmaming .001 4. .100 .010 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

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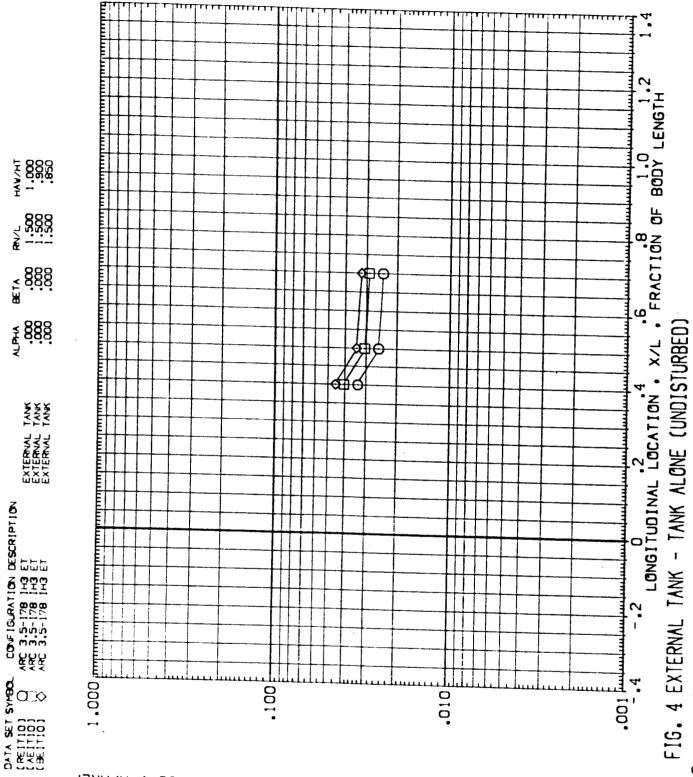
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1.000 900 950 850 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET DATA SET SYNBOL (RE110) (NE110) (BE110)

LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) 如中 010 00. .100

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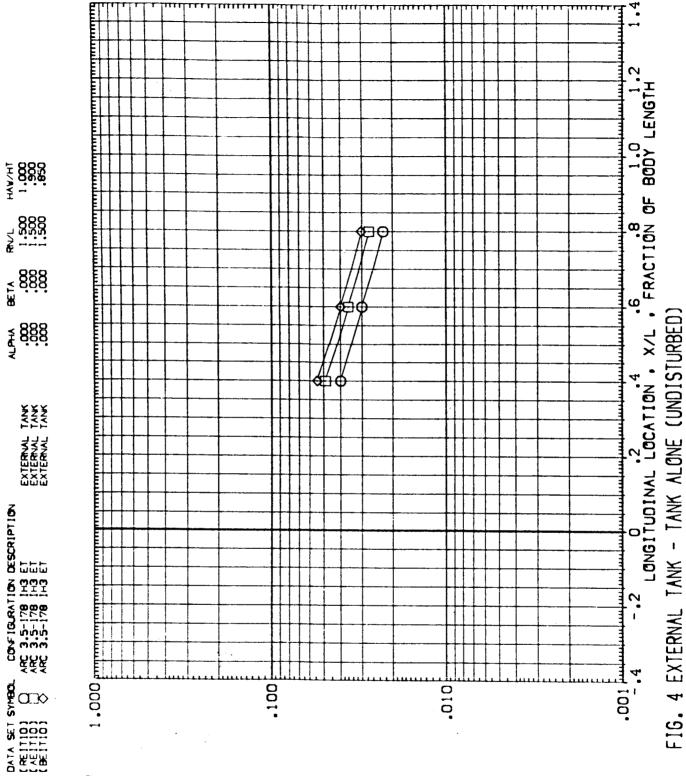
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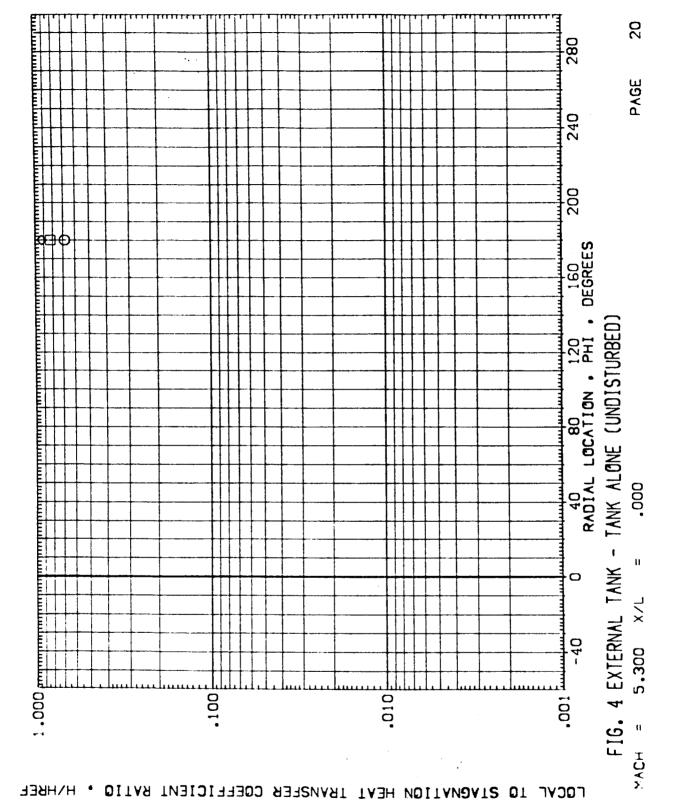
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₹ 9999 8009 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET DATA SET SYMBO.

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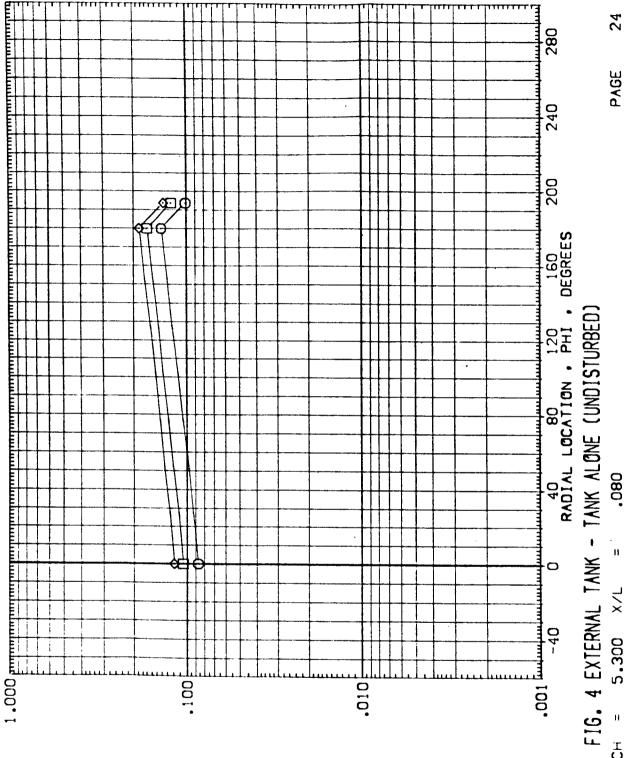
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A0 80 120 RADIAL LOCATION . PHI -40 100 .010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

TANK ALØNE (UNDISTURBED) FIG. 4 EXTERNAL TANK -5,300





26 280 PAGE 240 1.000 1.000 850 850 200 160 • DEGREES ₹ 868 808 FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) AD 80 120 RADIAL LOCATION , PHI (EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .200 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET 5.300 ×/L 1.000 DATA SET SYNBOL (REITIO) (BEITIO) (BEITIO) 100 010 MACH

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40 80 120 160 RADIAL LOCATION , PHI , DEGREES

TANK ALONE (UNDISTURBED)

FIG. 4 EXTERNAL TANK -

.00



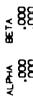


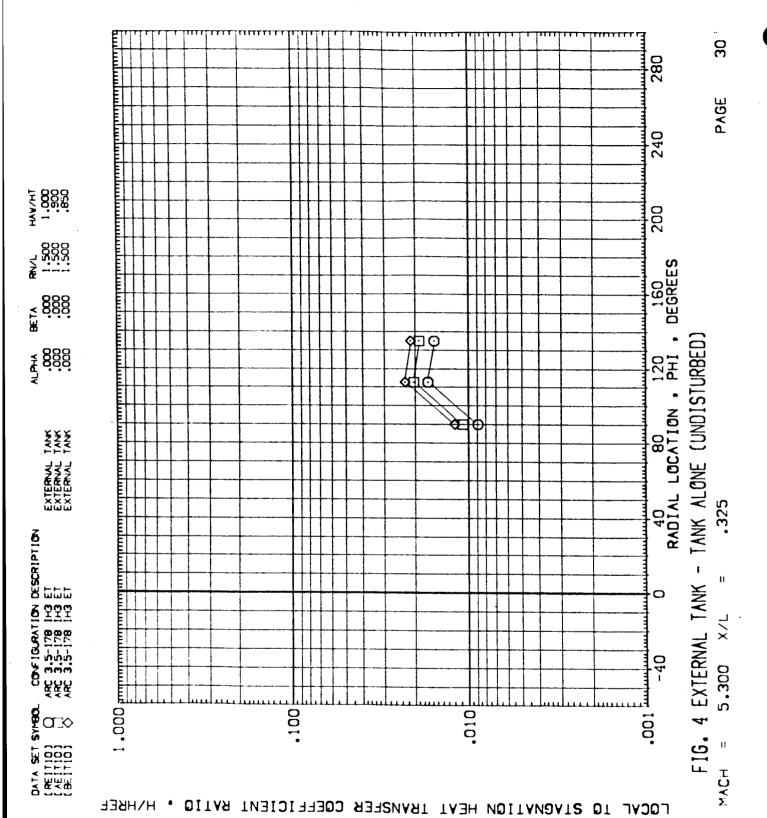






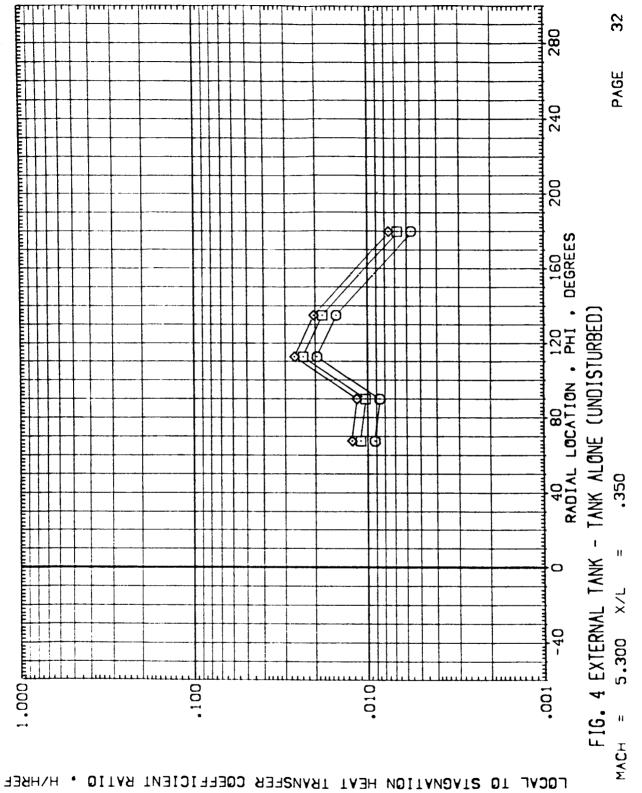






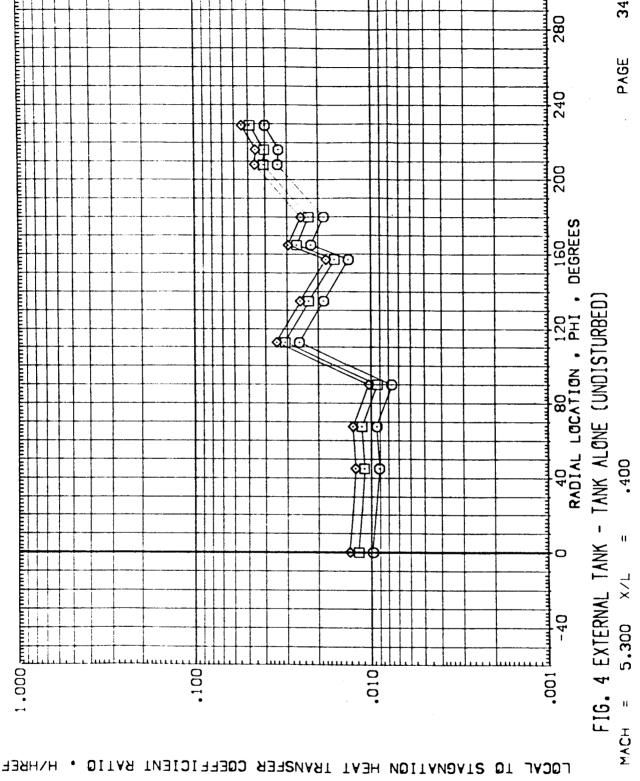
A. 8666 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET **8** C∑⊗ DATA SET 9 (REITIO) (AEITIO) (BEITIO)



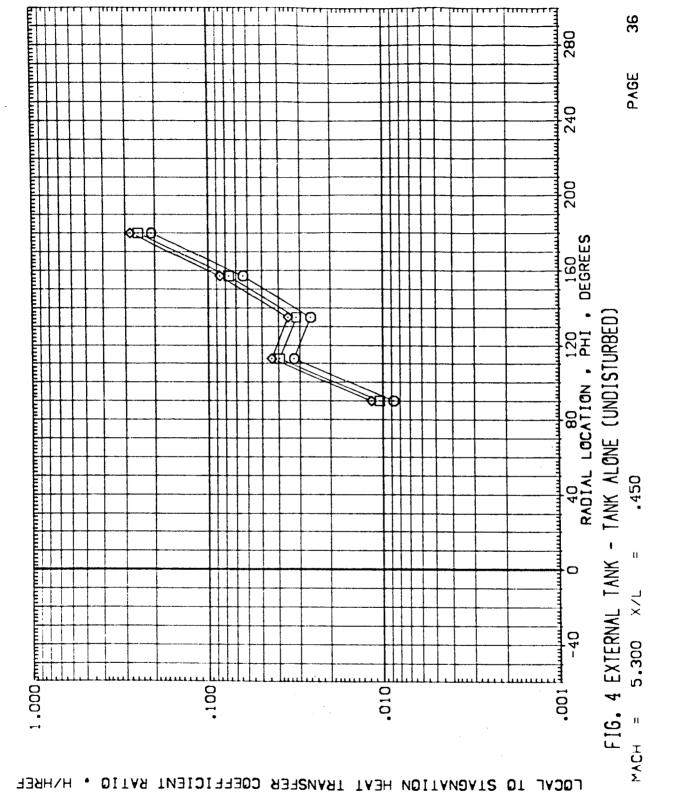


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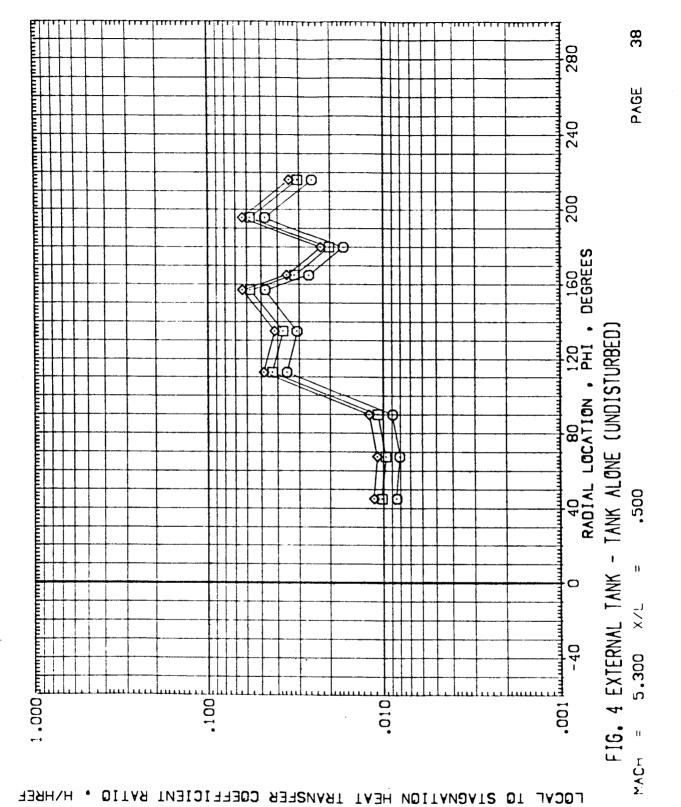
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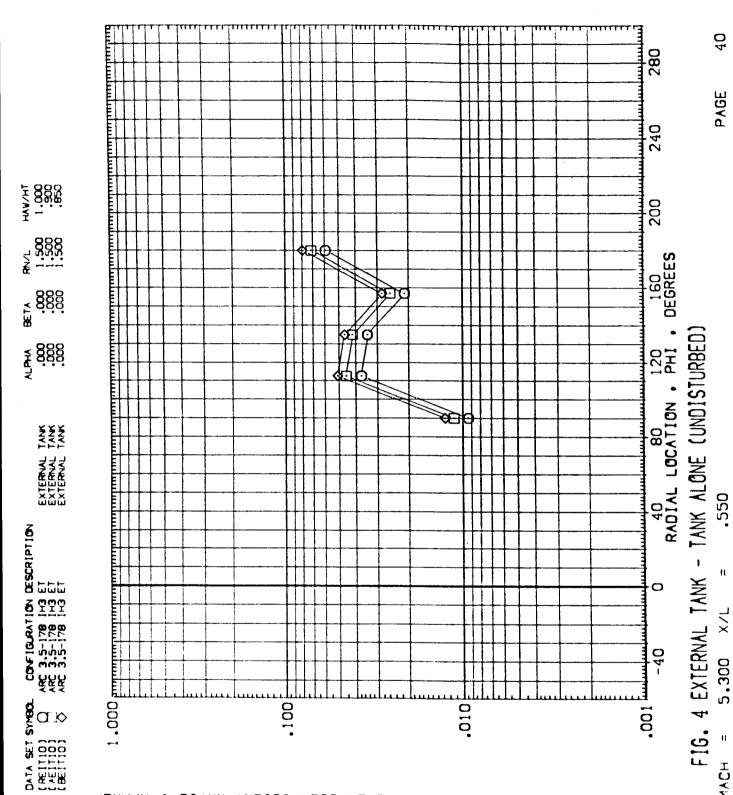
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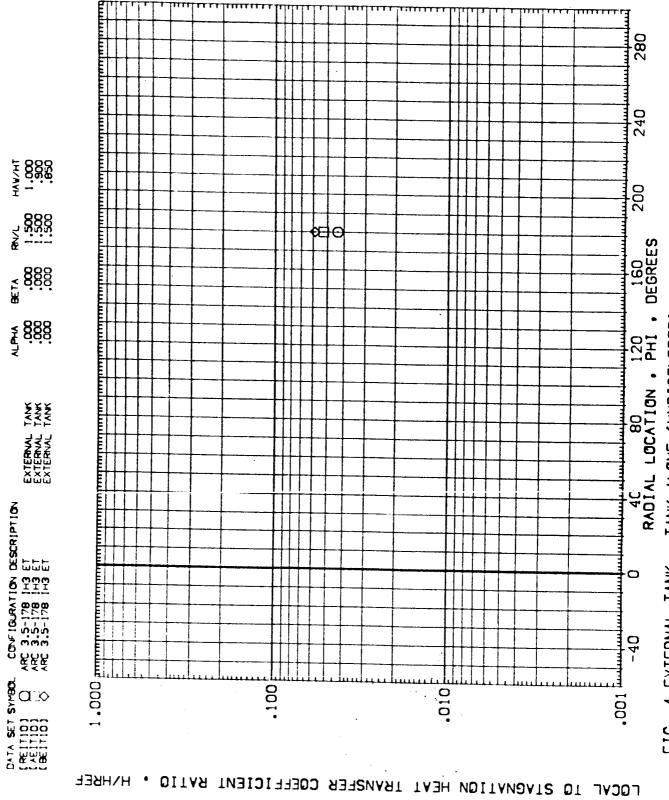




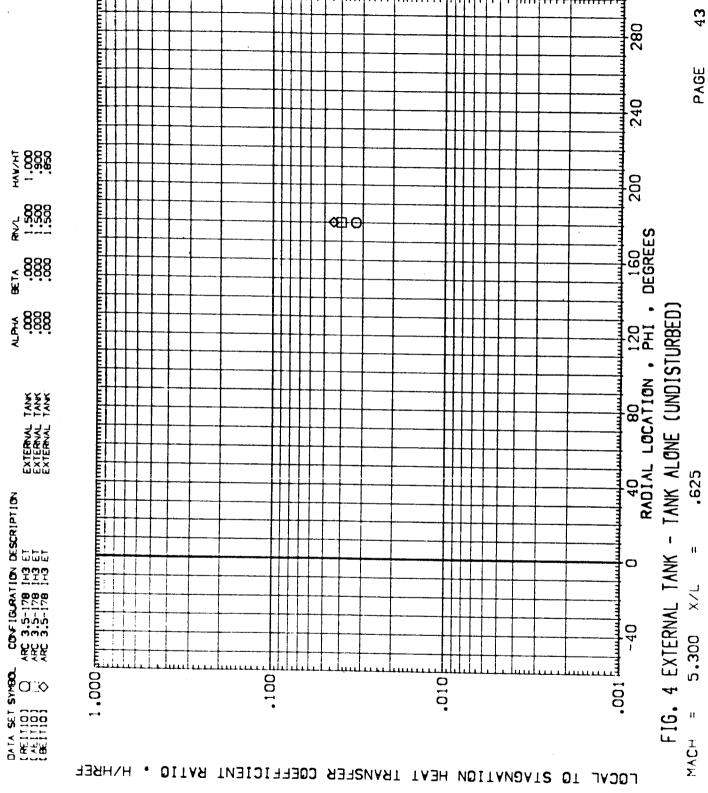


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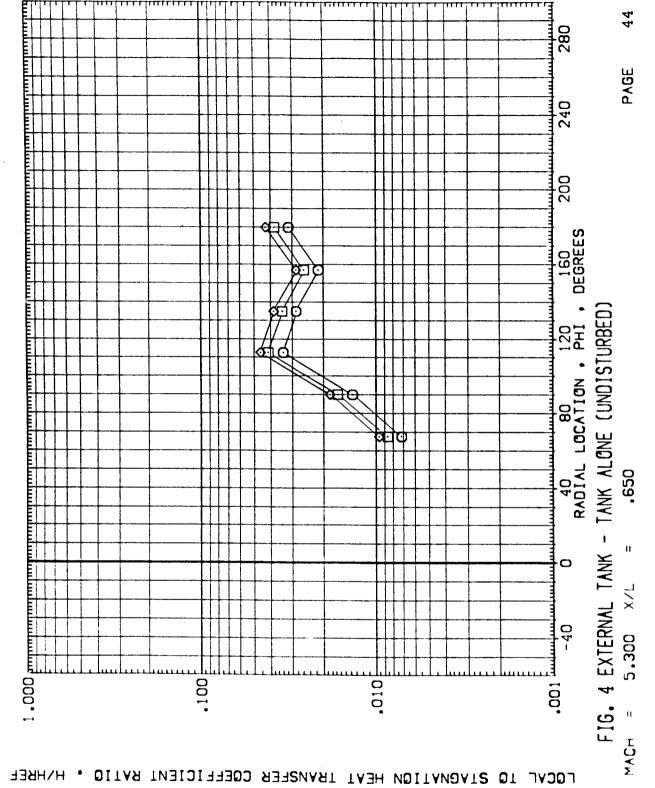








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H 2000 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET DATA SET ((RE1110) (AE1110) (BE1110)

46 280 PAGE **গ**্ৰত 200 160 DEGREES FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) 40 80 120 RADIAL LOCATION . PHI -001 .100 .010

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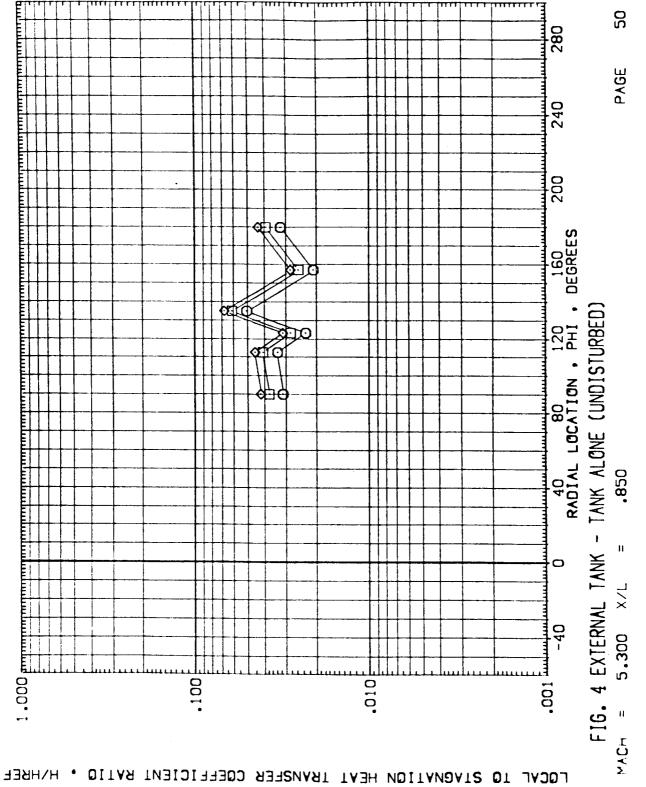
1.000 47 280 PAGE 240 200 oth Q A0 80 120 160 RADIAL LOCATION . PHI . DEGREES EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET -0 .100 010 DATA SET ((RE1110) (AE1110) (BE1110) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

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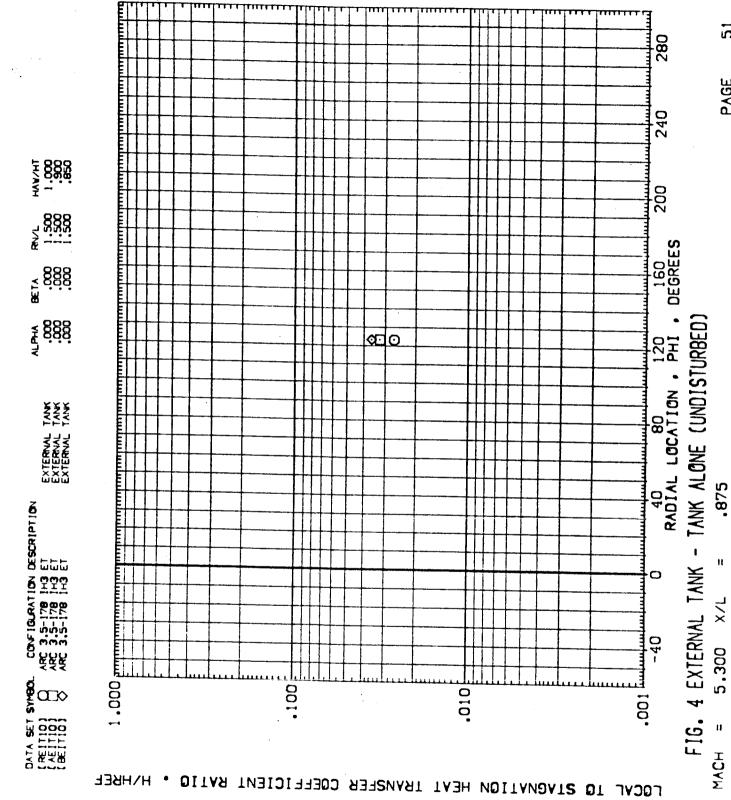
48 280 1.000 ժողուրդուրդուրդուրդուրդությունը և 1.000 ժողությունը և 1.000 40 80 120 160 RADIAL LOCATION . PHI . DEGREES FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) .800 5.300 X/L 010 .100 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF









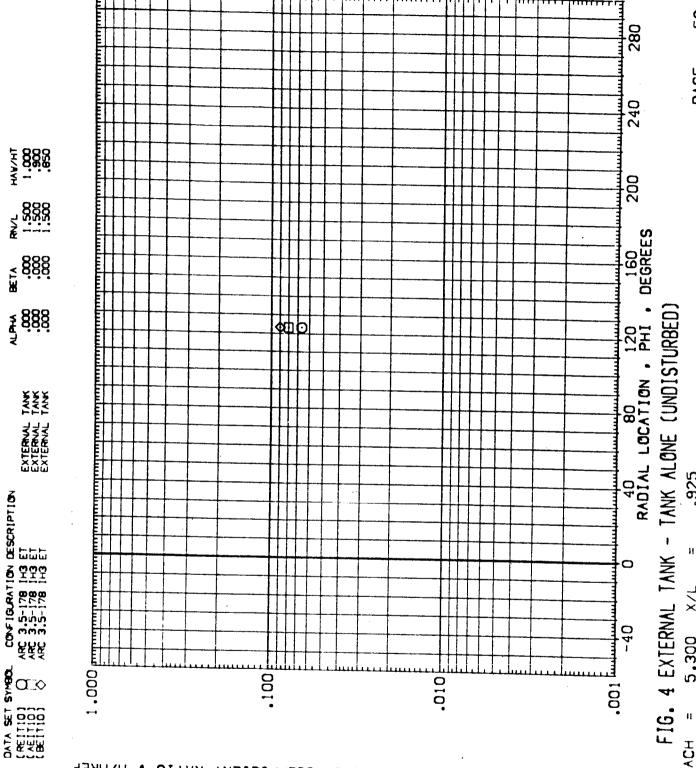


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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

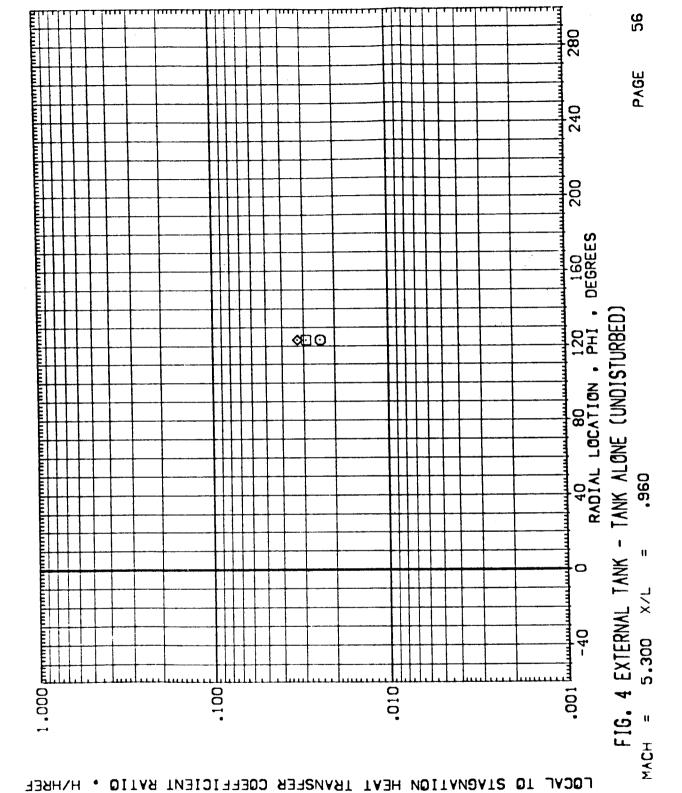
HAW/HT - 1000 900 950 ₹ **8**888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET

54 280 PAGE 200 40 80 120 160 RADIAL LOCATION , PHI , DEGREES ot∃o FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) .935 X/L -40 5.300 Ž CI⊅ 100 010 .001 DATA SET ((PE 1710) (AE 1710) (BE 1710) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER



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(AEITIO) ARC 3.5-178 IH3 ET
(BEITIO) ♦ ARC 3.5-178 IH3 ET

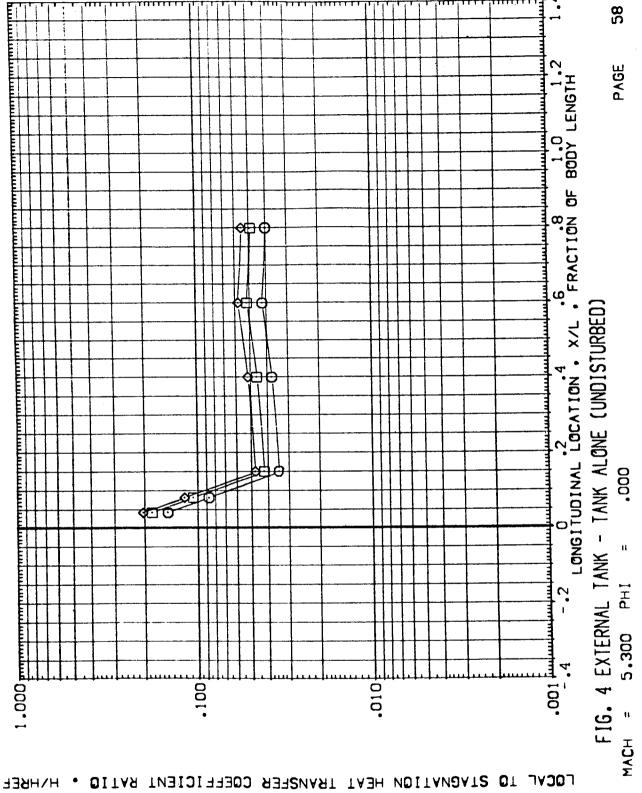
¥ 888





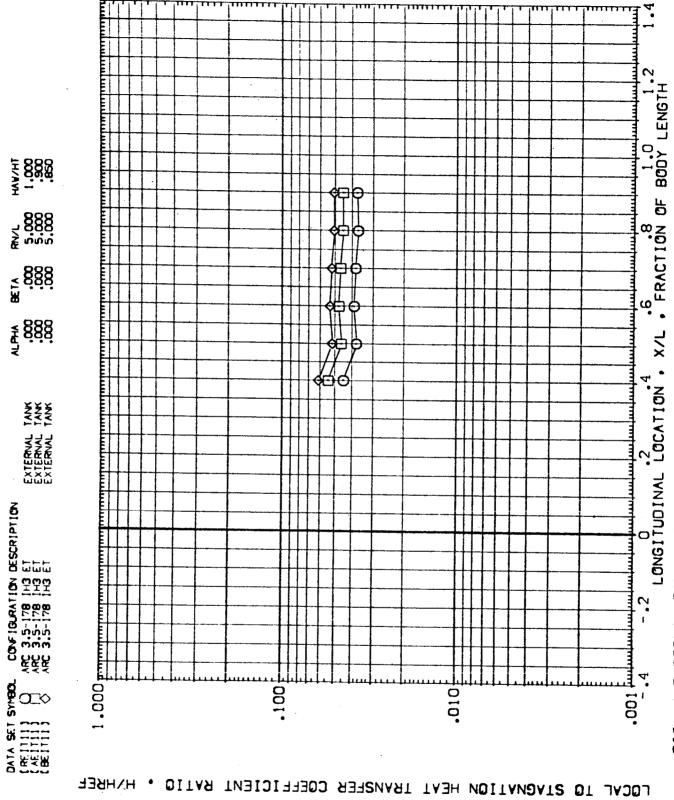
280 PAGE 240 200 ADIAL LOCATION . PHI . DEGREES ₹ 888 FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK DESCRIPTION ET ET ARC 3.5-178 H3 EARC 3.5-178 H3 EARC 3.5-178 H3 EARC 3.5-178 H3 EARC 3.5-178 H3 E 5.300 X/L -49 100 010 CAETTO CAETTO CBETTO CBETTO LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF







PAGE



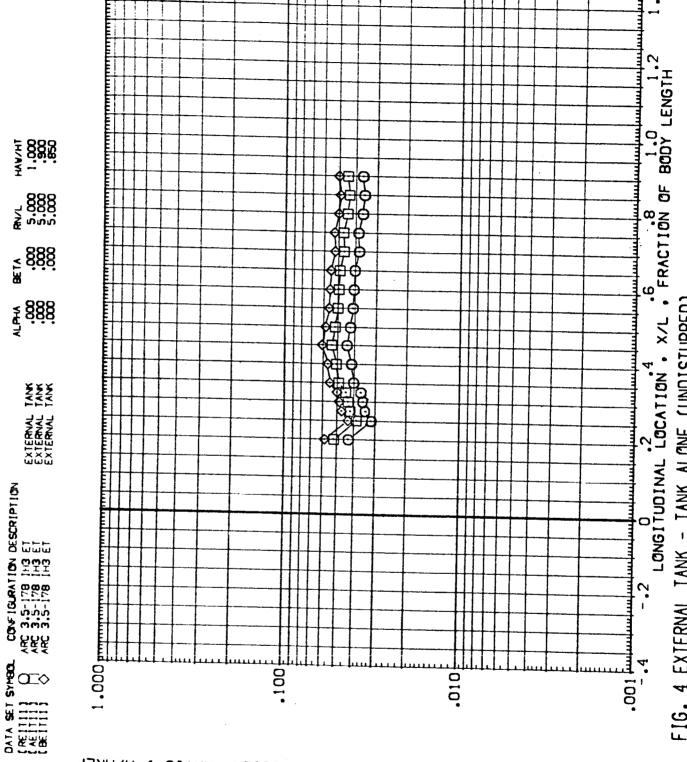
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

60

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

HAW/H1 1.000 8500 8500

₹ 888

A 8886

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET

SET SYMBOL ∞

DATA SET 9 (RE 1111) (AE 1111) (BE 1111)



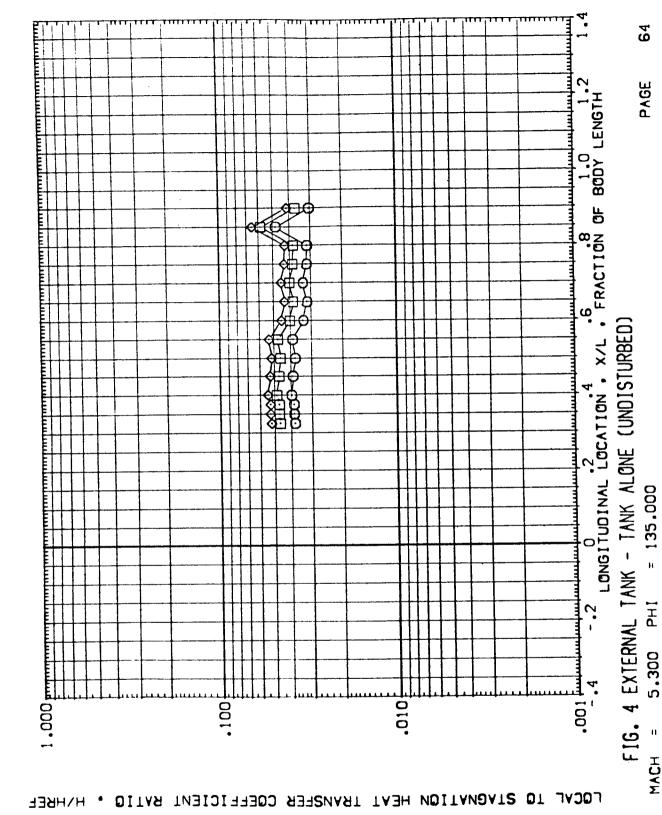
PAGE

= 123,000 5,300

| DATA SET SYMBOL CONFIGURATION DESCRIPTION | EXTERNAL TANK | .000 | (AE1111) | ARC 3.5-178 | H3 ET | EXTERNAL TANK | .000 | (AE1111) | ARC 3.5-178 | H3 ET | EXTERNAL TANK | .000 | (BE1111) | ARC 3.5-178 | H3 ET | EXTERNAL TANK | .000 |

₹ ოოო 2000 2000

888 888





65 BODY LENGTH 1.000 քողոդրարարարարադաղուդությունություրություրությունություրություրություրություրությունությունությունում 1.000 900 8500 8500 <u>কাত</u> LONGITUDINAL LOCATION . X/L . FRACTION OF # ₹ 866 888 ₹ 8888 888 FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) COVFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET 5,300 DATA SET SYMBOL 100 .010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

100

.010

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

99

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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH

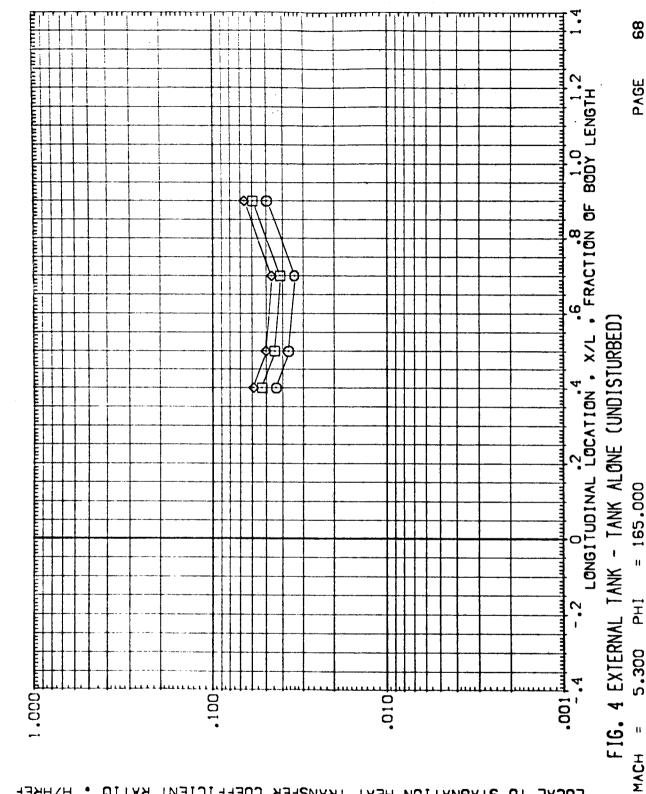
.001

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) H = 5.300 PHI = 157.000









HAYH - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 -

888 888

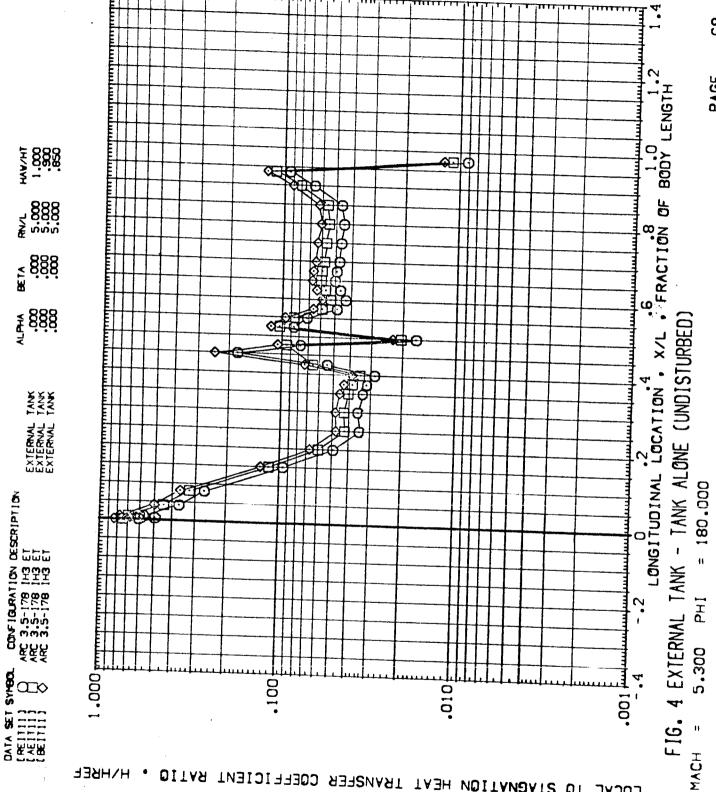
EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET

DATA SET SYMBO.



FOCYF 10 SIVENYIION HEYI IBYNZEER COEFFICIENI BATIO . HVHREF



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

H/W/H 000. 85008.

OESCRIPTION ET ET

ARC 3.5-178 11 ARC 3.5-178 11 ARC 3.5-178 11 ARC 3.5-178 11

OATA SET ((RE1111) (AE1111) (BE11111)

LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) .001

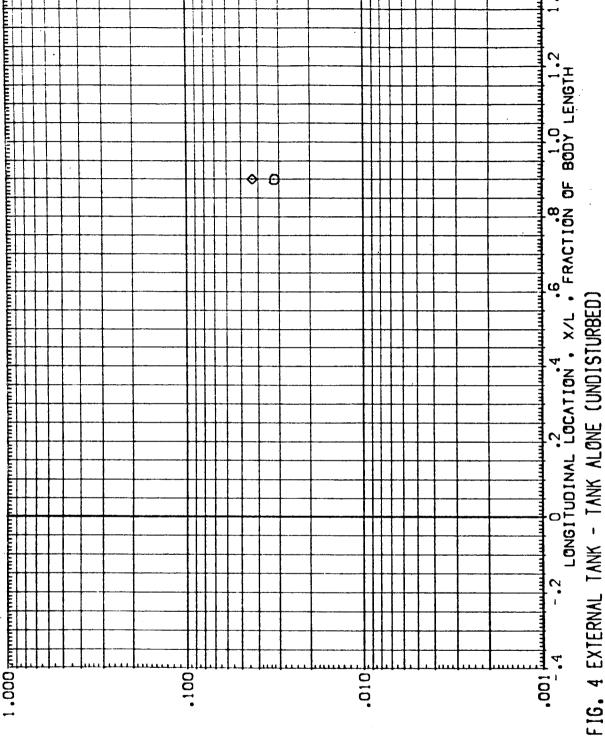
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

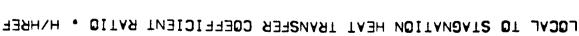


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= 194,000







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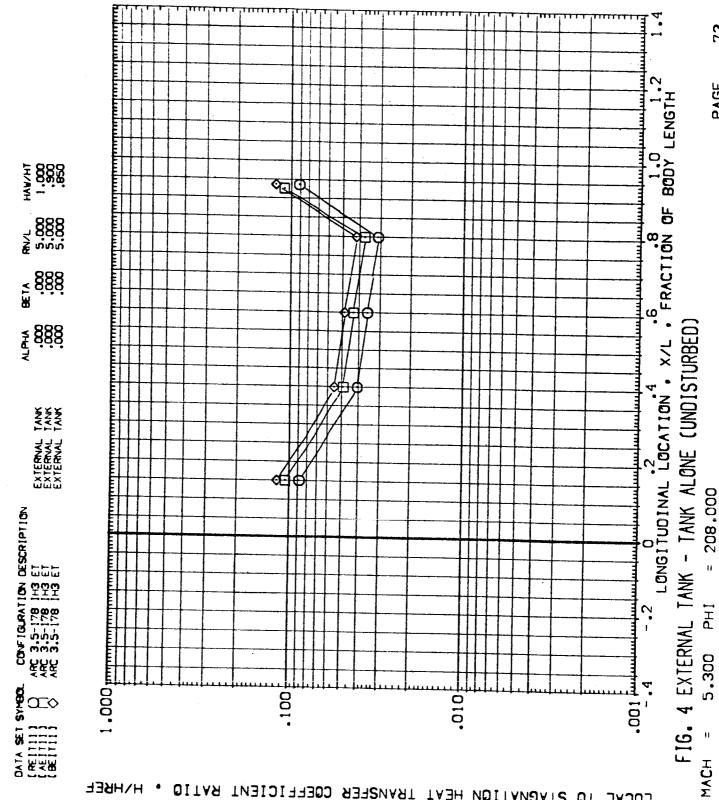
72

= 197,000

PHI

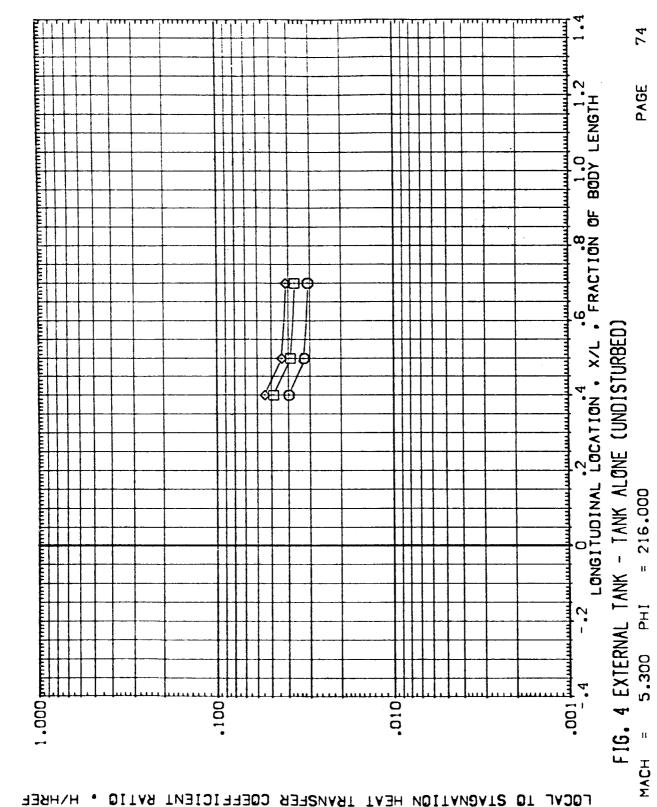
5,300

MACH



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF





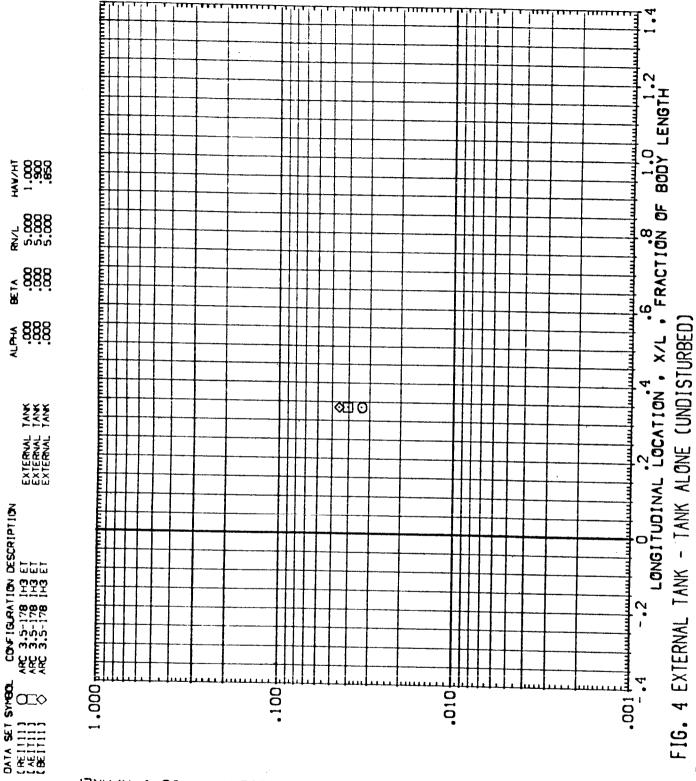


222.500

PH.

5.300

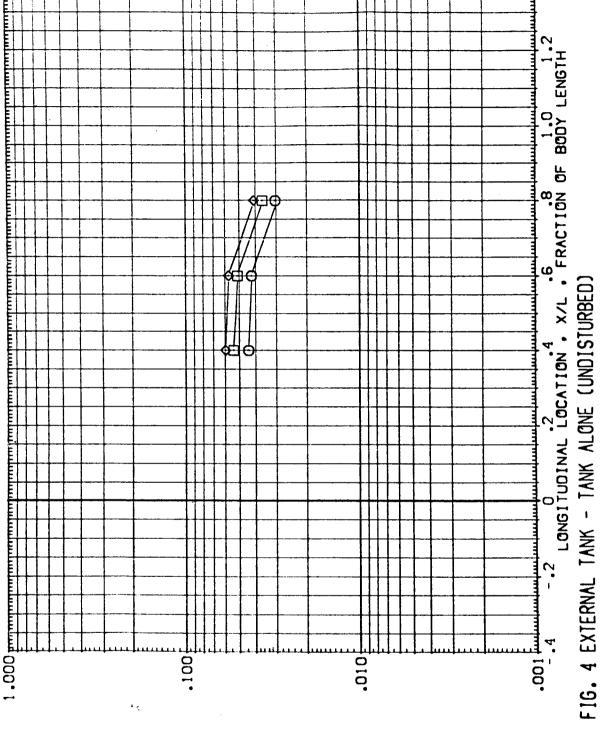
MACH



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

H/WH 1.000 0.000 0.000 0.000 0.000 ₹ %%% 988 888 # 888 후 888 1 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET DATA SET SYNBOL

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HTHREF





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229,000

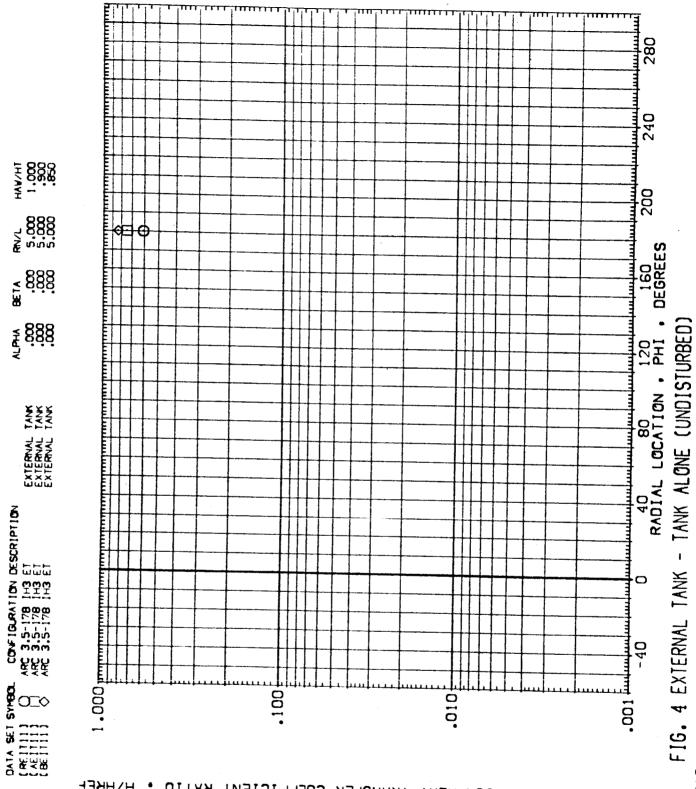
11

PH.

5.300

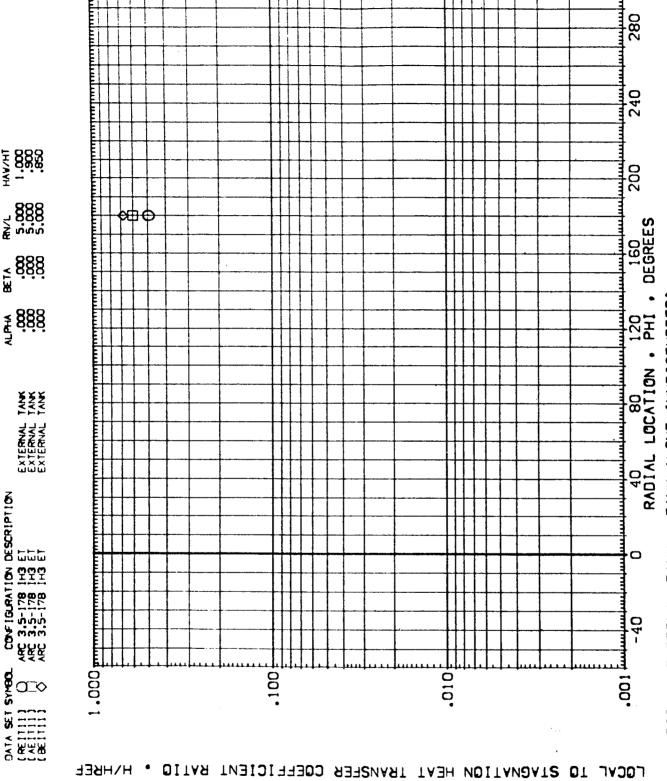
MACH

5.300 X/L



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HYHREF

1.000 9.000 8.000 8.000 ₹ ₩₩₩ 9000 Å 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET

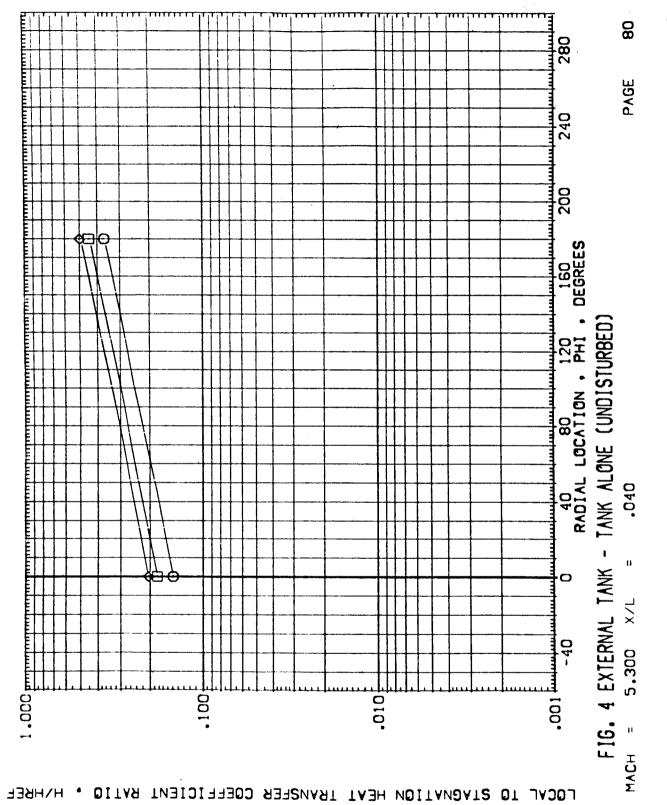


TANK ALONE (UNDISTURBED) FIG. 4 EXTERNAL TANK -5.300

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1.000 950 950 950 ₹ ოოო 9889 888 ¥ 888 \$ EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET

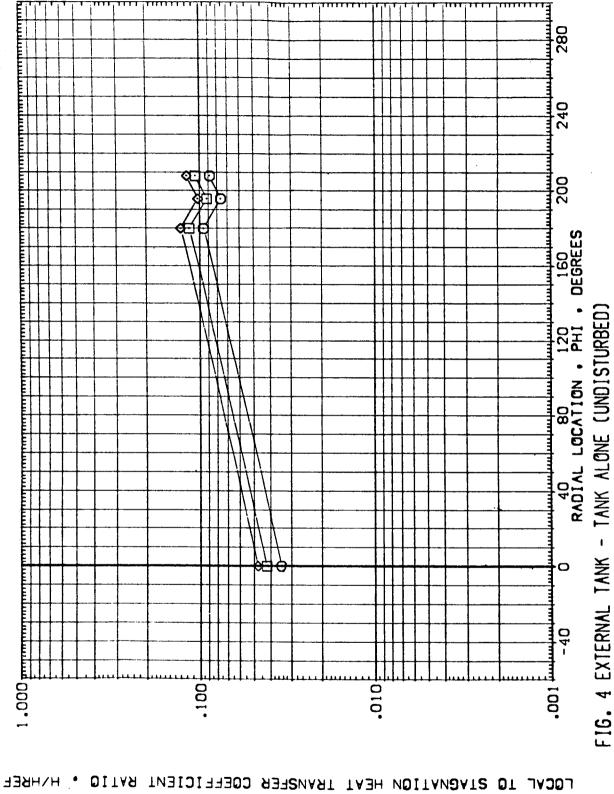




1 •000 թողուդրուրուրությություրություրություրություրություրություրություրություրությությությություրություրությու 8 PAGE 1.000 900 8000 8000 200 ø⊒ ø ₹ 8.0.0.0 0000 0000 RADIAL LOCATION , PHI , DEGREES ¥. 6000 6000 Å 9889 ¥ TANK ALONE (UNDISTURBED) EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET FIG. 4 EXTERNAL TANK -DATA SET SWED.
(RE1111) 100 .010 .001 MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HYHREF

1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 % vo.v. vo. ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET SYMBO ∞

DATA SET 9 (-RETTILI) (-RETTILI) (-BETTILI)





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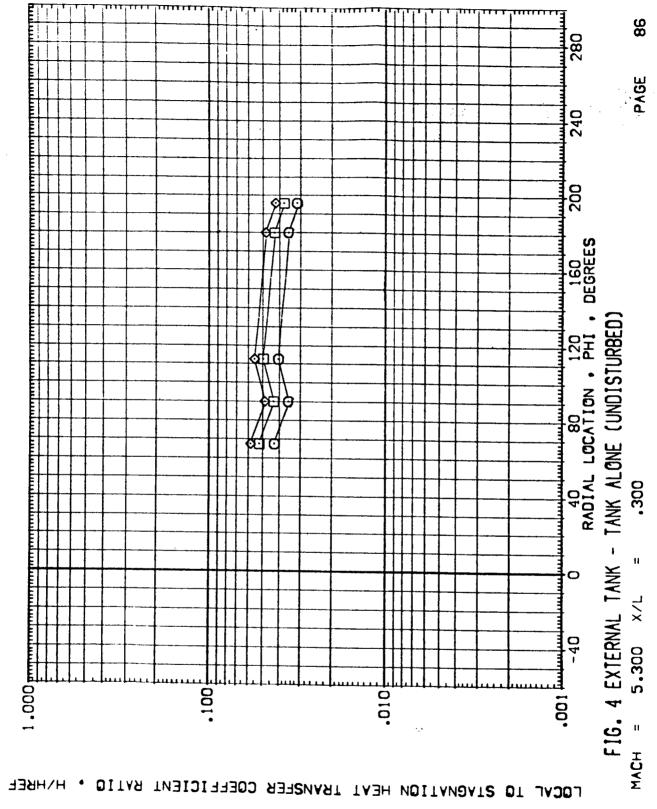
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



PAGE 84

.250

5,300



1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000

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EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET

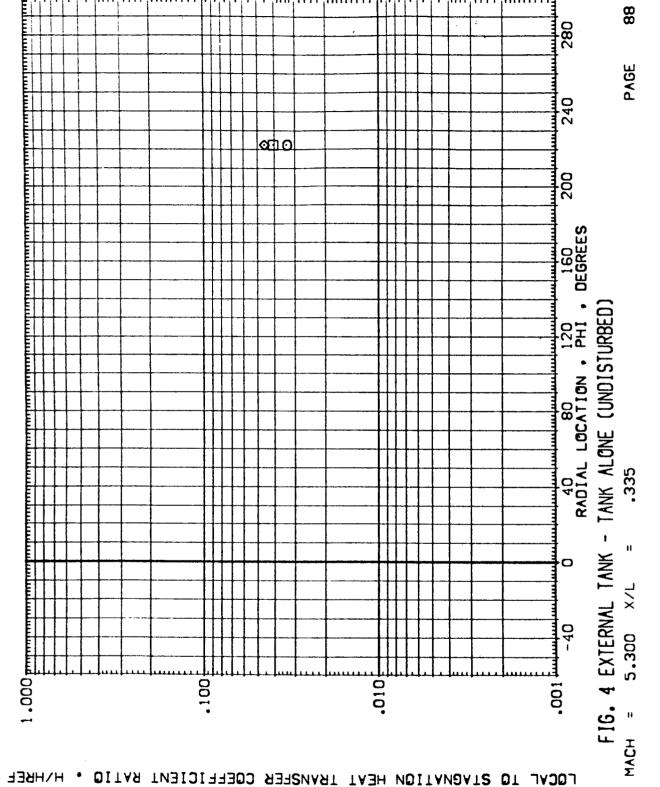
¥ 0....

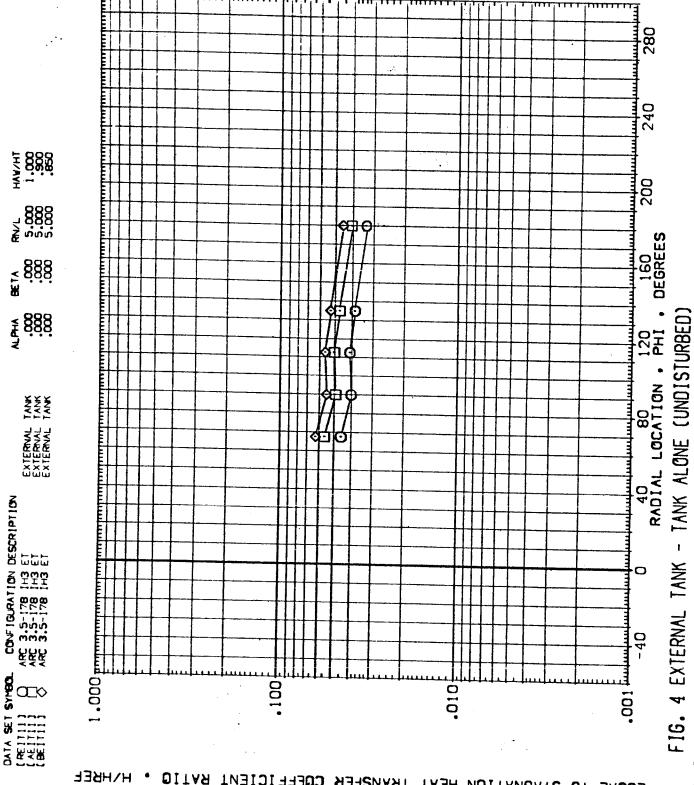
OATA SET ((RE1111) (AE1111) (BE11111)



87 PAGE HAW/H 00000 9000 9000 9000 200 ₹ 8869 888 ADIAL LOCATION . PHI . DEGREES **6**0 600 ₹ 888 888 TANK ALONE (UNDISTURBED) EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET FIG. 4 EXTERNAL TANK --40 DATA SET SYNBOL 100 .010 8 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO H\H&EE

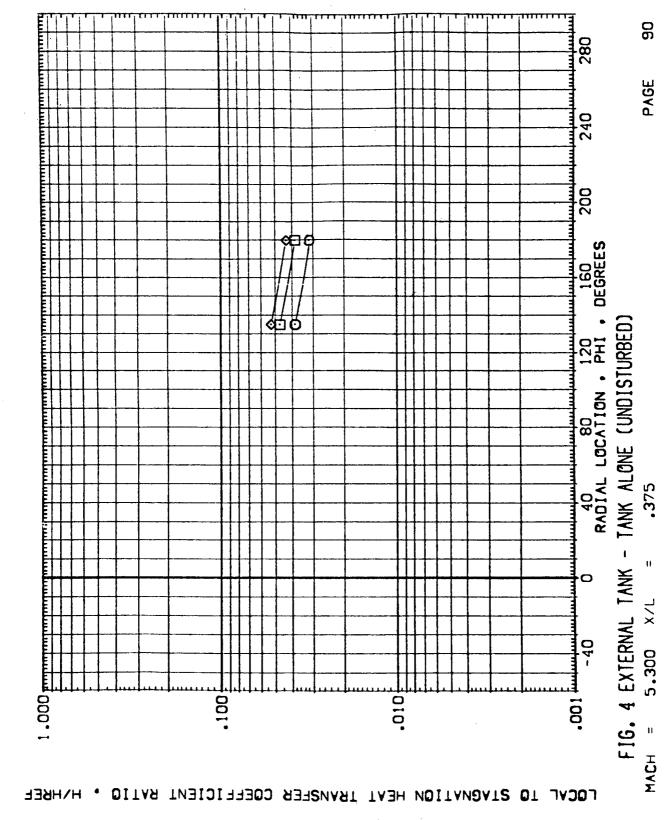
HAV/HT ₹ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET DATA SET SYMBOL





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HYHREF

¥ -8889 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET CRETTIES OF SYNBOL





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EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

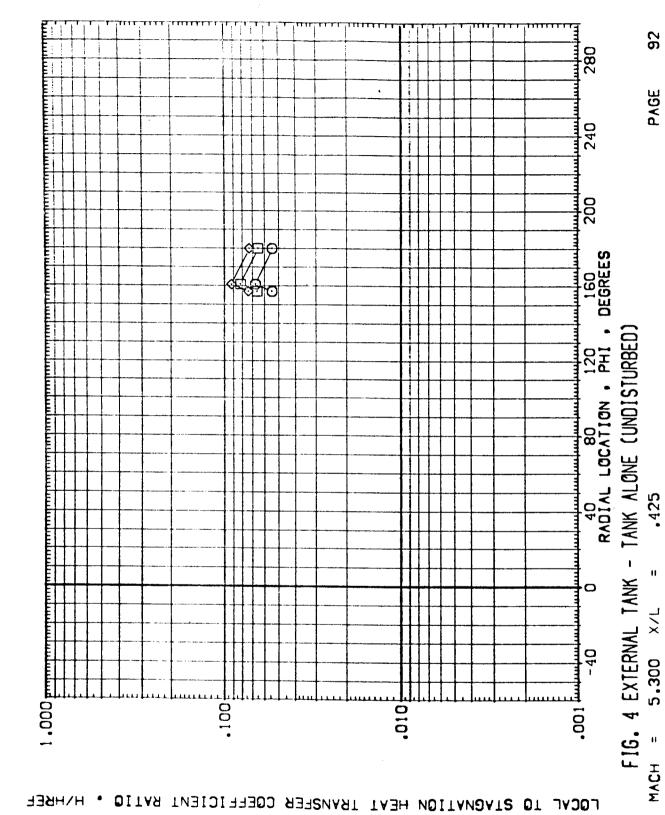
CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET

SET SYMBOL

DATA SET 9 (RE1111) (AE1111) (BE11111)

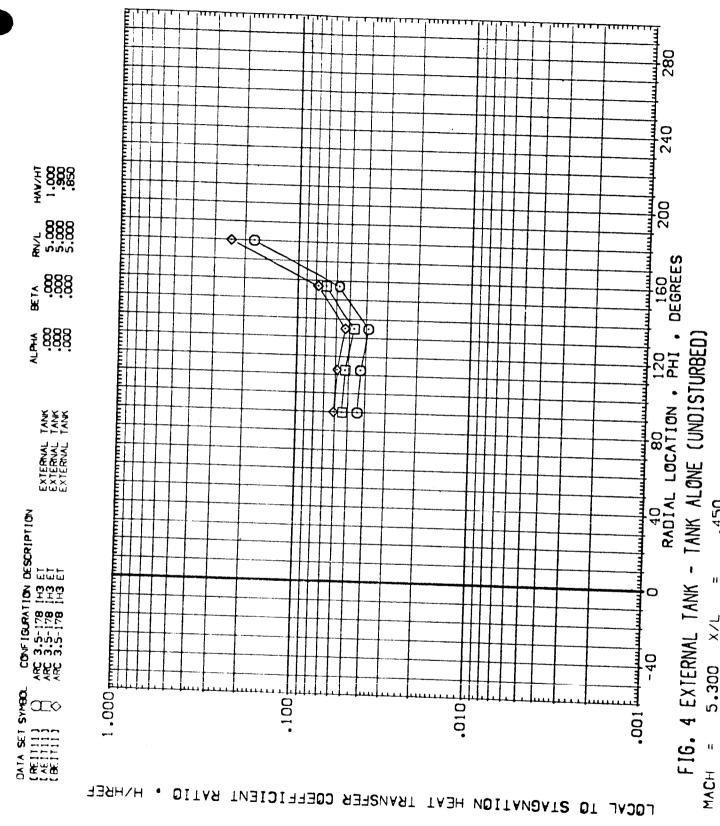
#X 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.0

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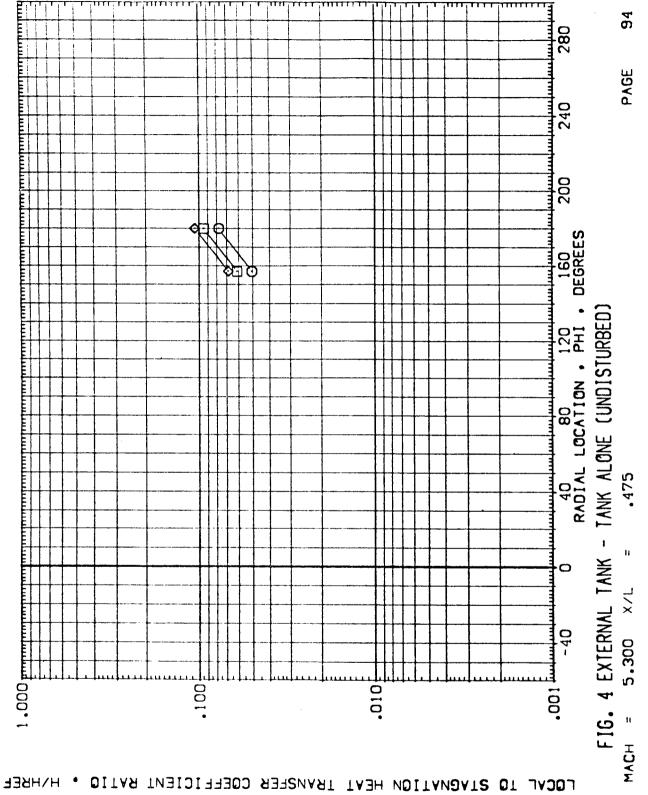
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1.000 1.000 850 850 4 9888 9889 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET **§** a=⋄ CRE 11113 (AE 11113) (BE 11113)

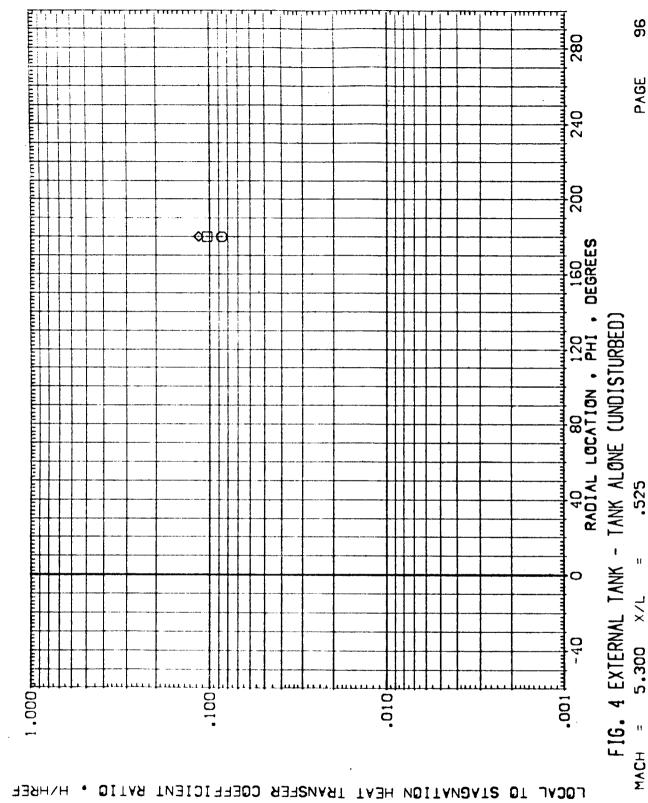




EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET DATA SET SYMBOL

1.000 9000 85000

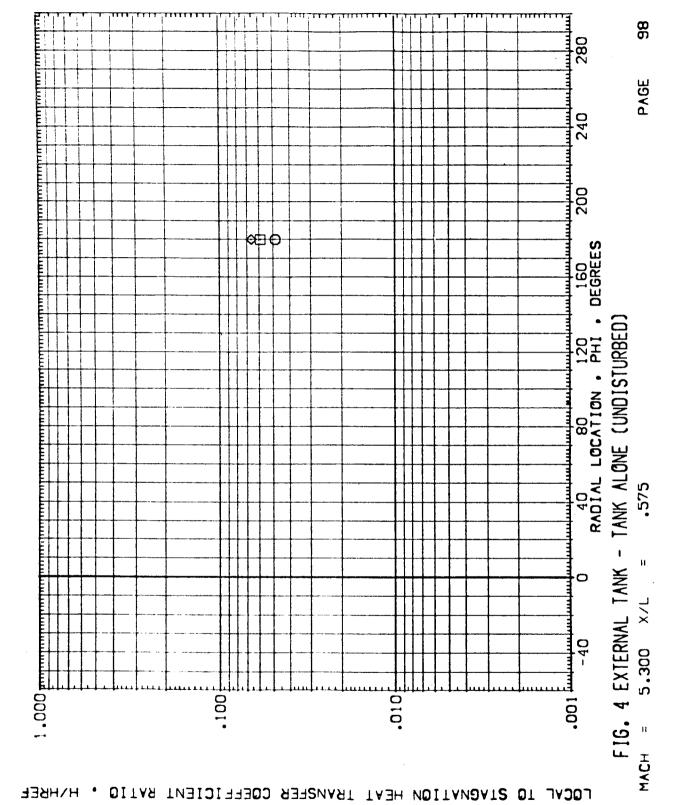
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PAGE 1.000 1.000 1.000 1.000 1.000 1.000 200 .v.v.v. .0000 .0000 ADIAL LOCATION . PHI . DEGREES Å 8689 8089 **4** 0 FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK COVE IGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET 5,300 DATA SET SYMBOL (RE1111) O (BE11111) O (BE11111) .100 010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET DATA SET SYNBOL





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CONFIGURATION DESCRIPTION ARC 3.5-178 IHB ET ARC 3.5-178 IHB ET ARC 3.5-178 IHB ET

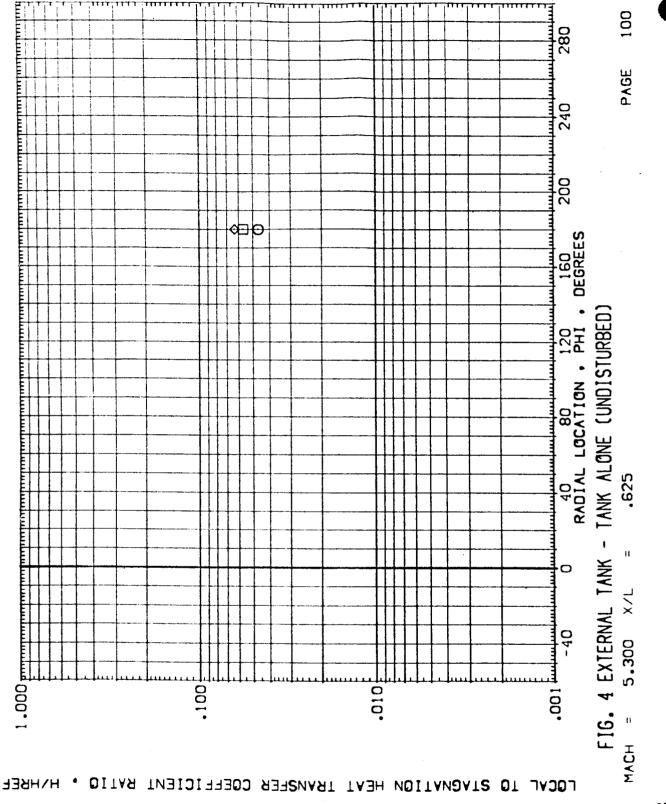
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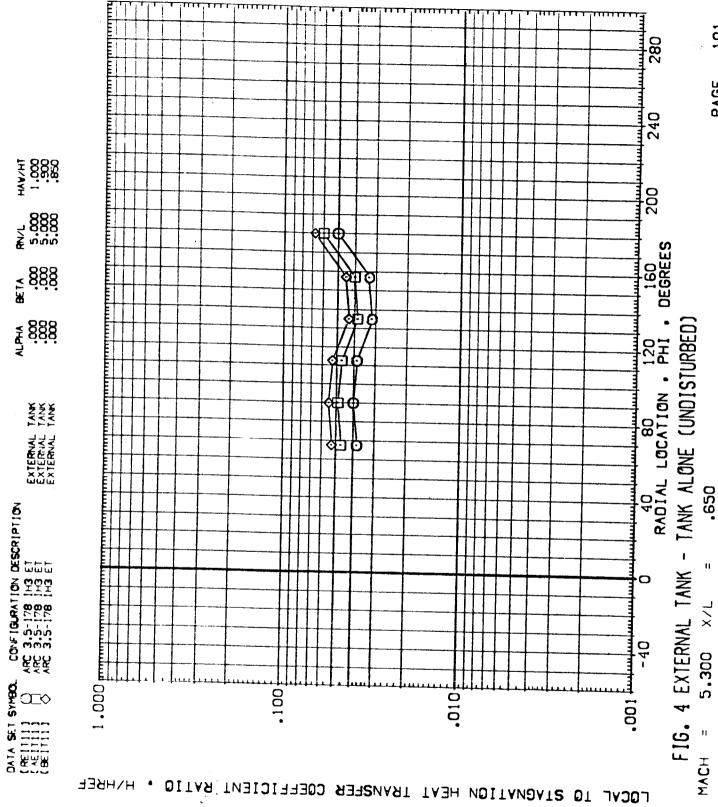
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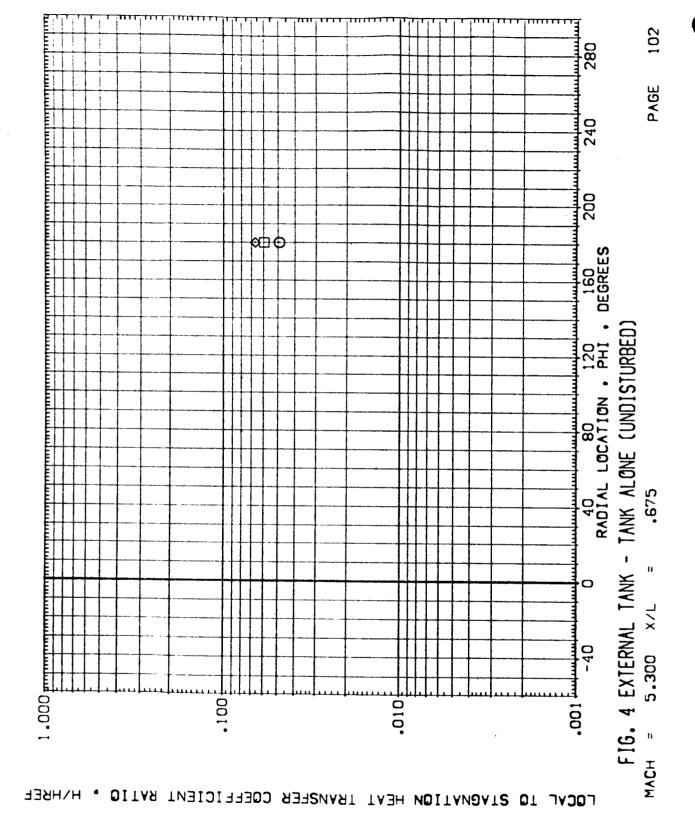
1.000 .900 .850 # \$888 \$888 £ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET 0ATA SET SYMBO.
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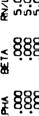
103 280 1.000 1.000 1.000 1.000 1.000 900 RADIAL LOCATION , PHI , DEGREES # 5000 5000 **\$** ₹ 8668 8086 TANK ALONE (UNDISTURBED) EXTERNAL EXTERNAL EXTERNAL 900 都肯 CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET ARC 3.5-178 1H3 ET FIG. 4 EXTERNAL TANK -5.300 X/L DATA SET SYMBO.

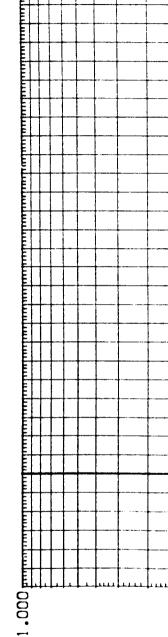
(RETTILL)

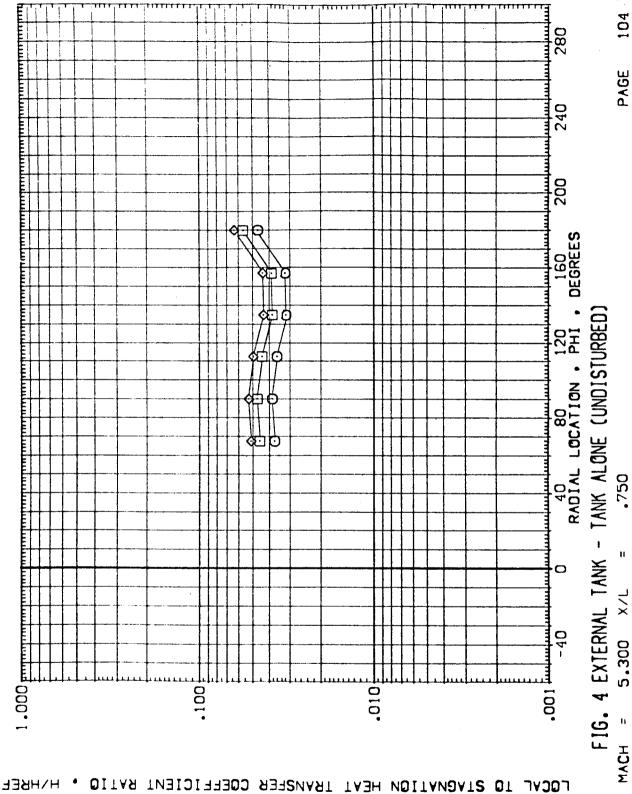
(AETTILL) 100 .010 90. LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET **8** 0 □ ♦ DATA SET ((RE1111) (AE1111) (BE11111)

HAYH 9000 9000 9000 9000





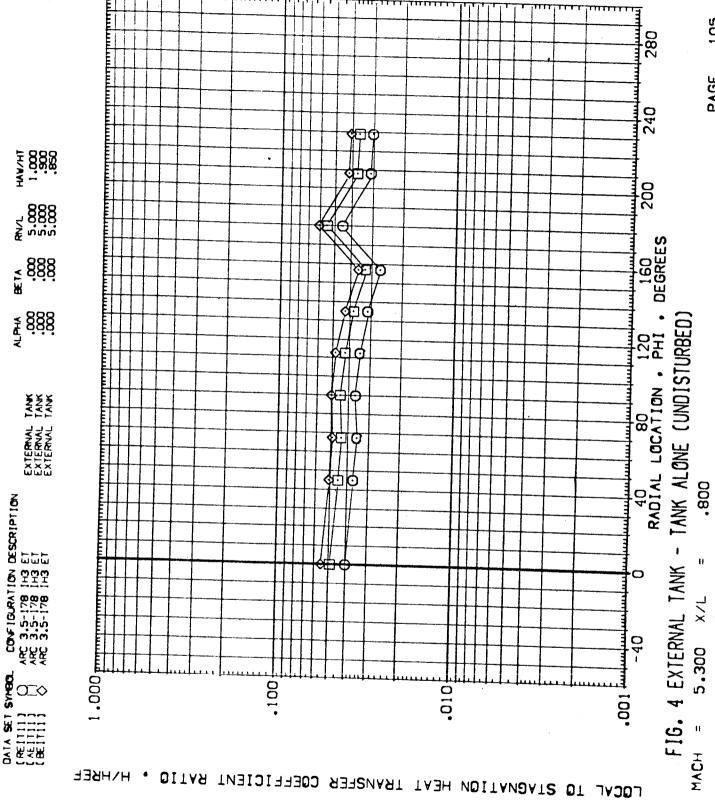




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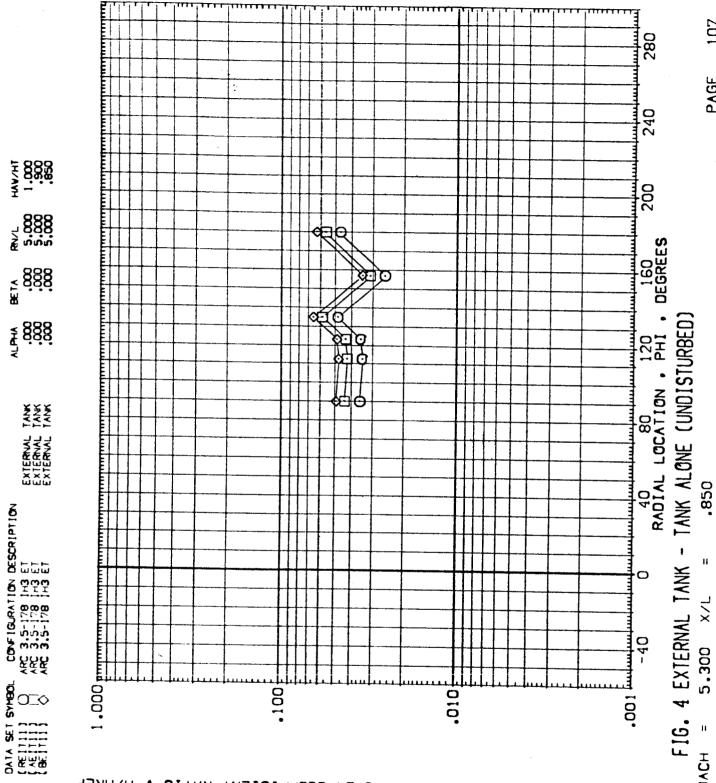


1 •000 քաղադրարադրագրություրություրություրություրություրություրություրություրություրություրություրություրությու HAW/HI 1.000 1.000 1.000 1.000 1.000 ₹ 8888 000 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET .100 DATA SET 8 (RE1711) (AE1711) (BE1711)

106 280 PAGE 200 AD 80 120 160 RADIAL LOCATION . PHI . DEGREES TANK ALONE (UNDISTURBED) FIG. 4 EXTERNAL TANK -ᆿㅁ 5,300 .001 T 010

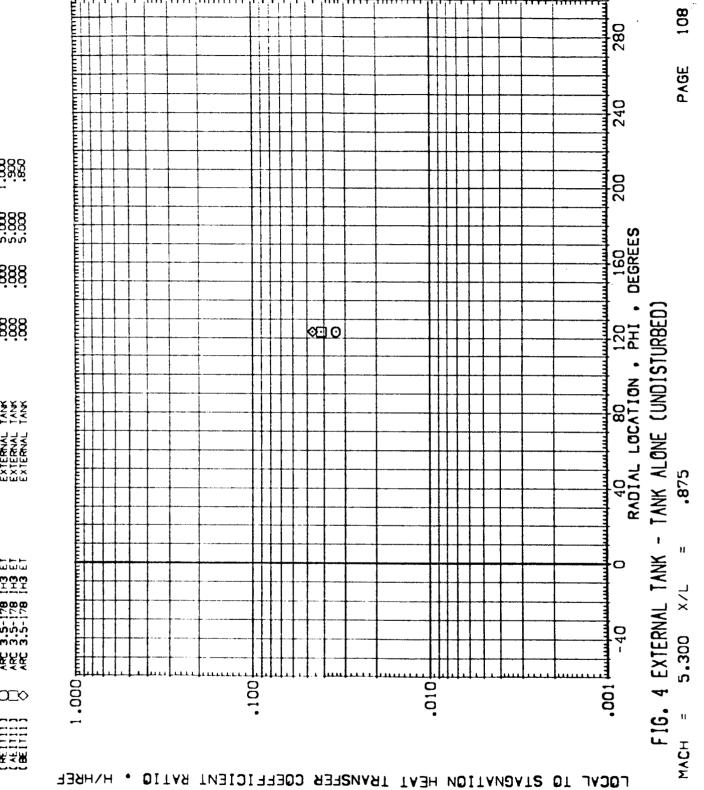
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1.000 1.000 850 850 ⁴ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET DATA SET SYMBOL





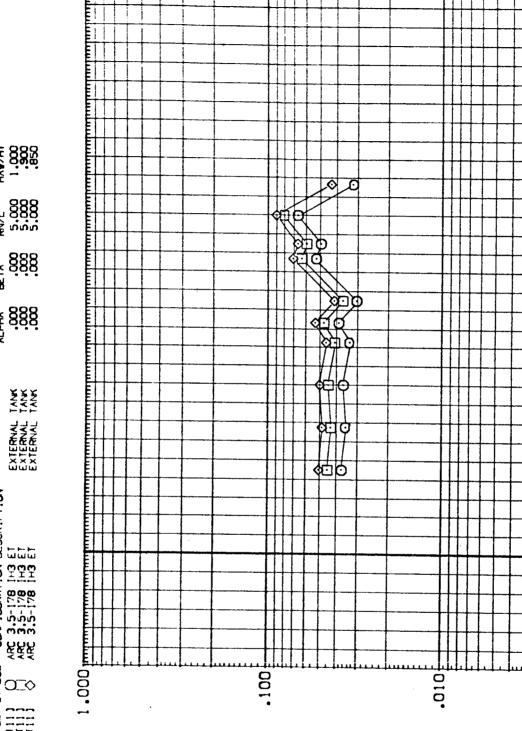
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HAW/HT 1.000 1.000 1.000 1.000 1.000 ⊡ # 888 888 . . ₹ 888 000 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET 0A7A SET SYMBOL (RE1111) (CAE1111) (CAE1111) 100 010

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FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) H = 5.300 ×/L = .925

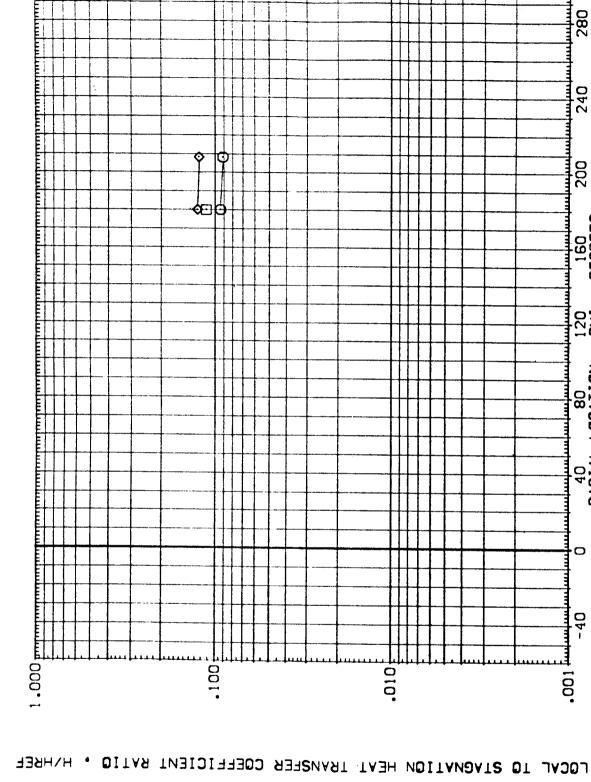
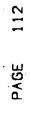


FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) 5,300

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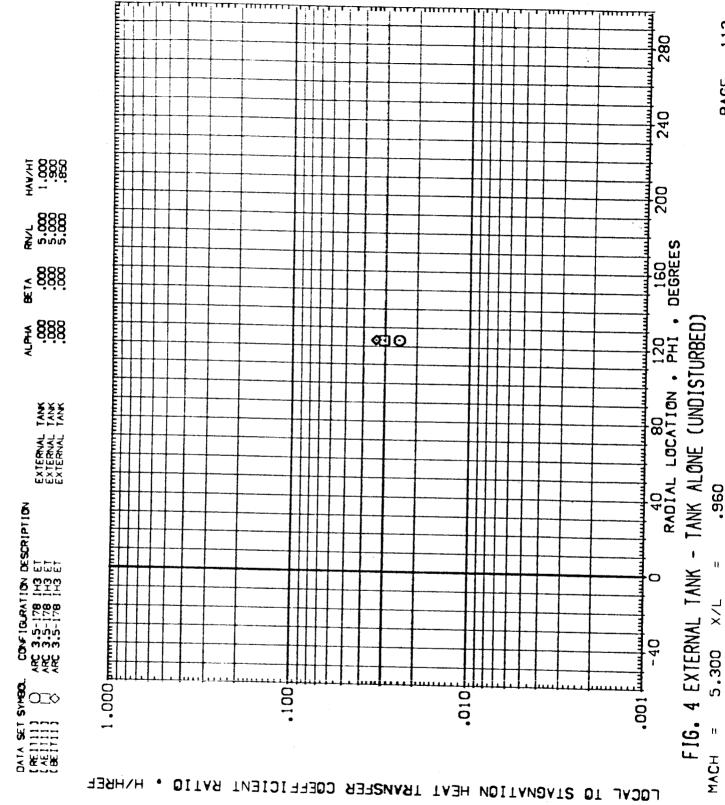


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> EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET ARC 3.5-178 IH3 ET



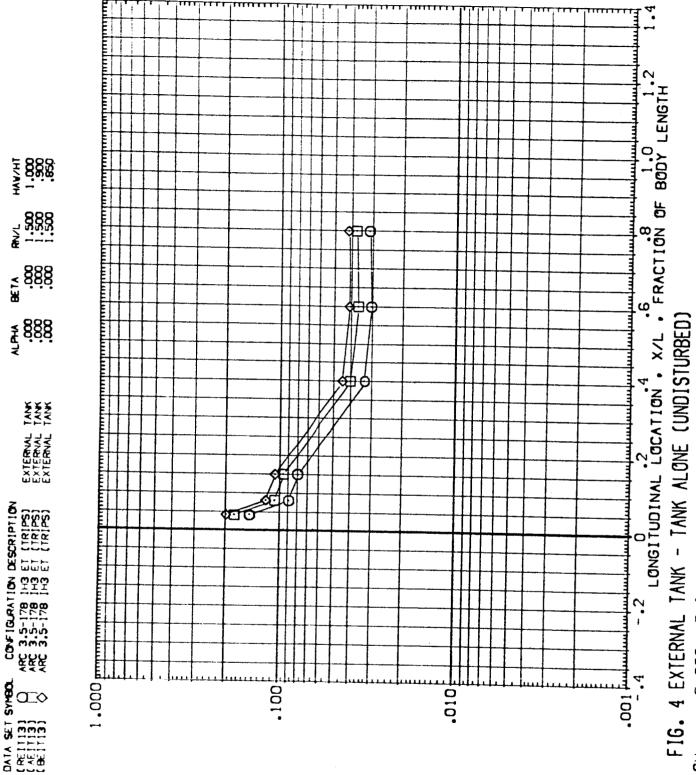
FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)
MACH = 5.300 ×/L = .975

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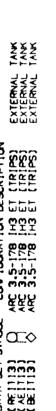
40 80 120 RADIAL LOCATION . PHI .

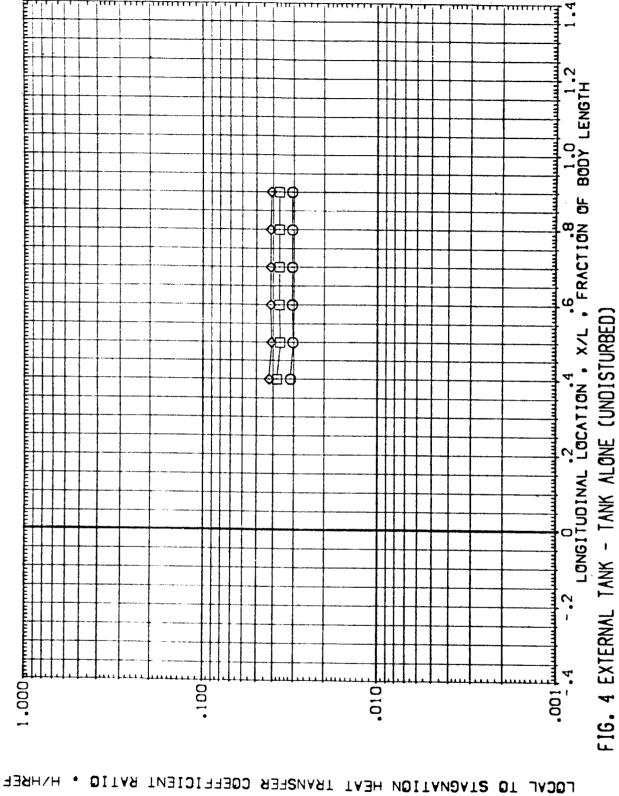


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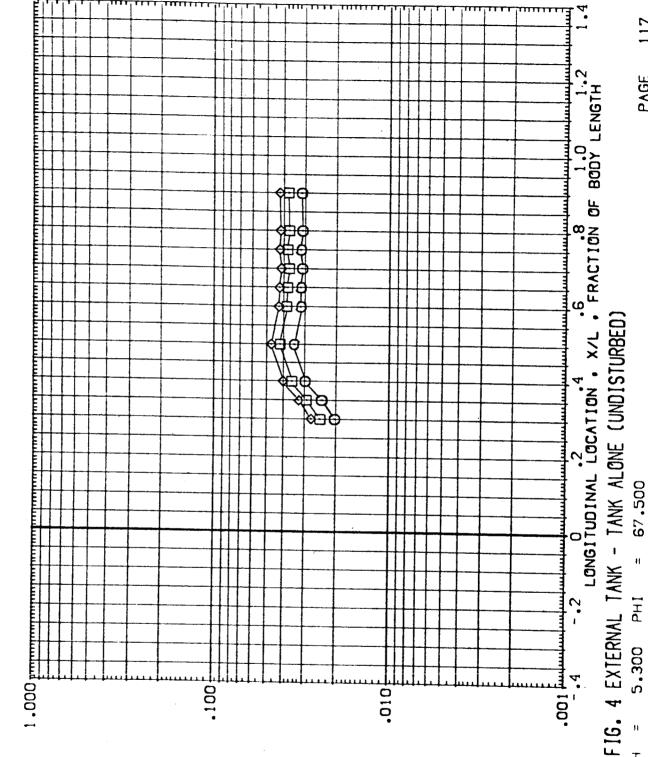
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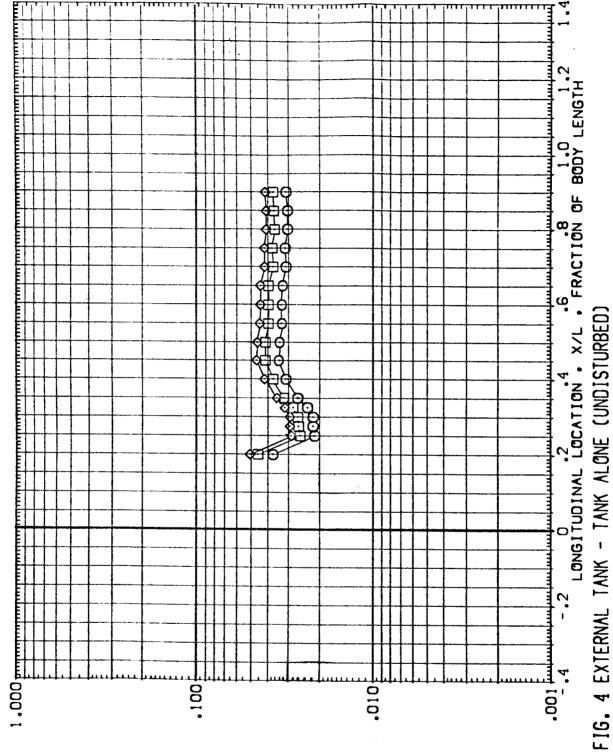
EXTERNAL EXTERNAL EXTERNAL

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS)

DATA SET SYNBO.
[RE1113] (RE1113) (SE1113)

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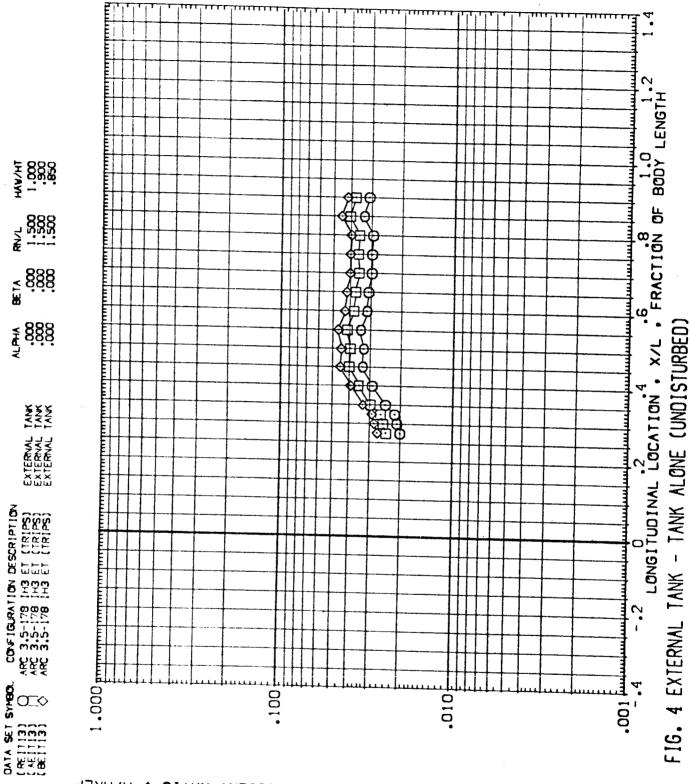




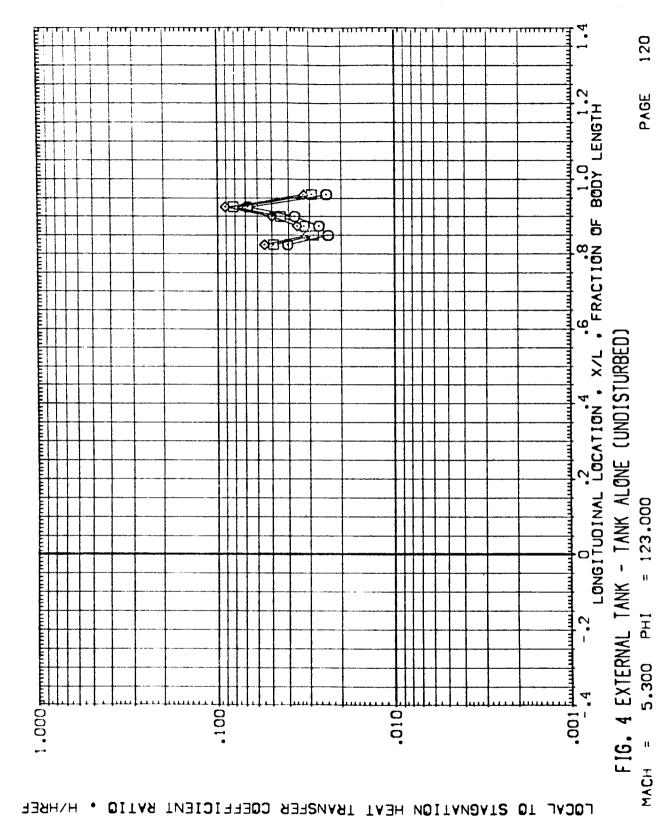
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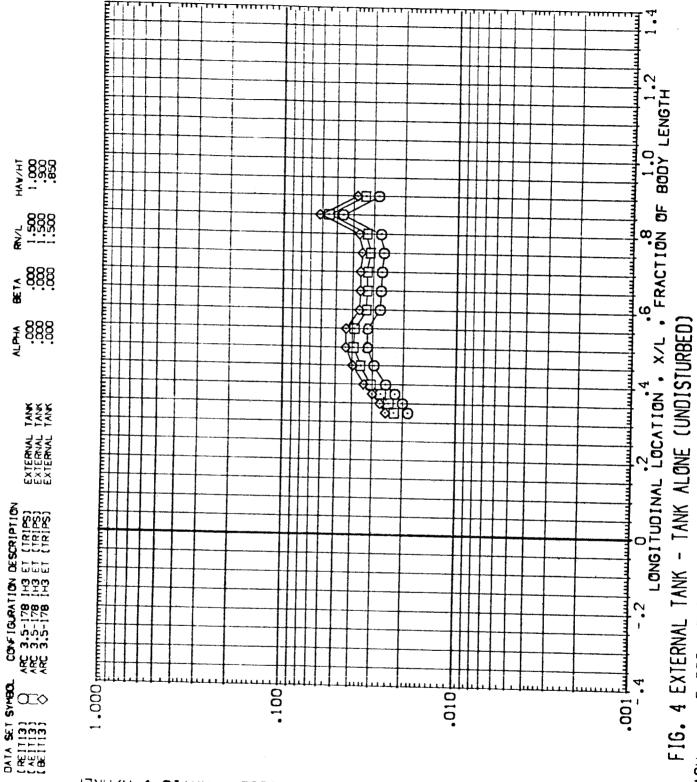
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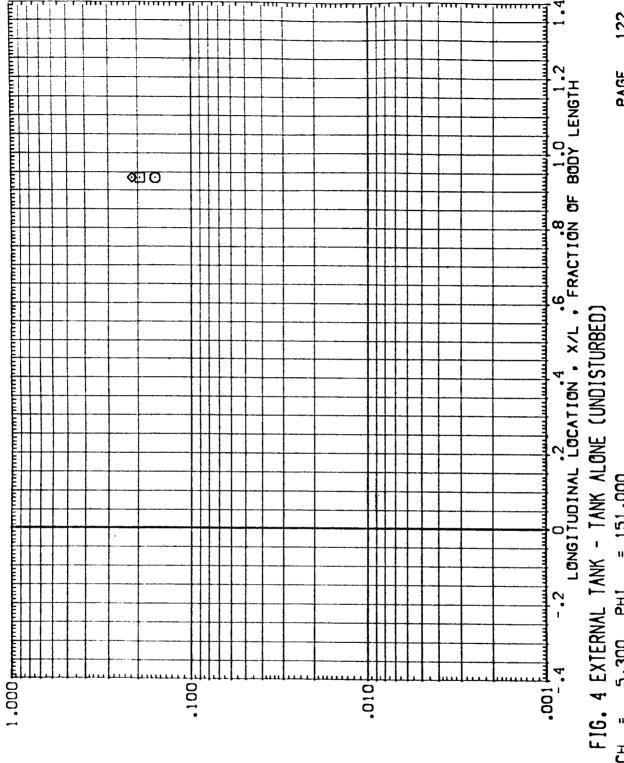
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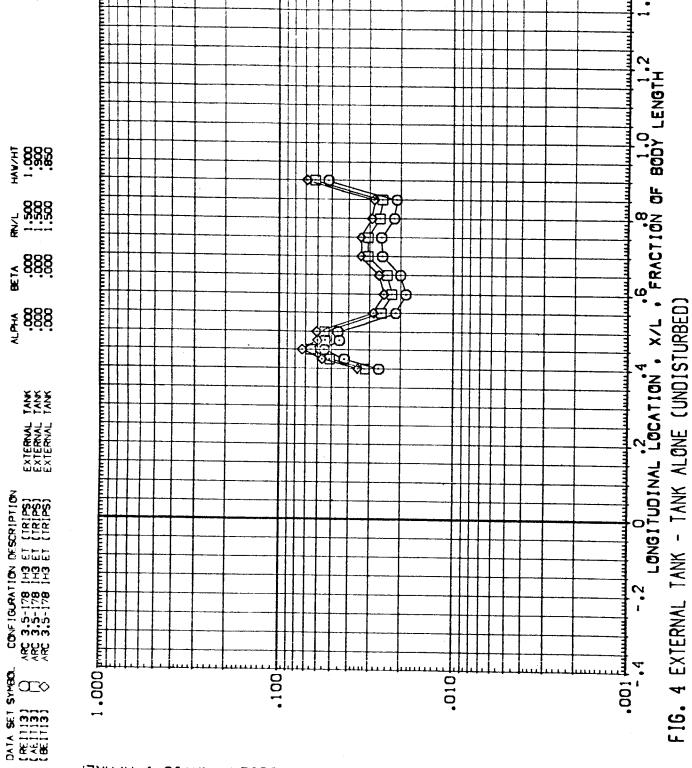
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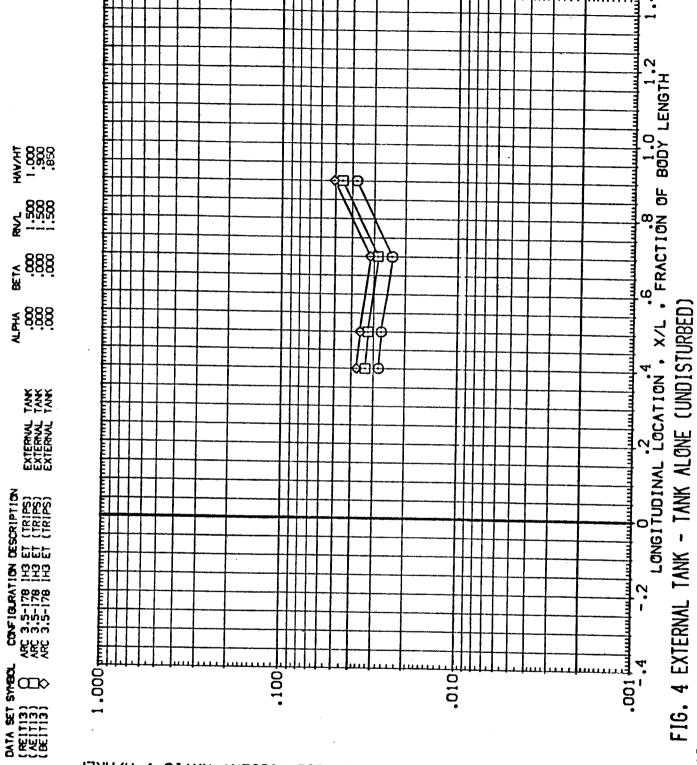


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124 PAGE LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) 5,300 .001 MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



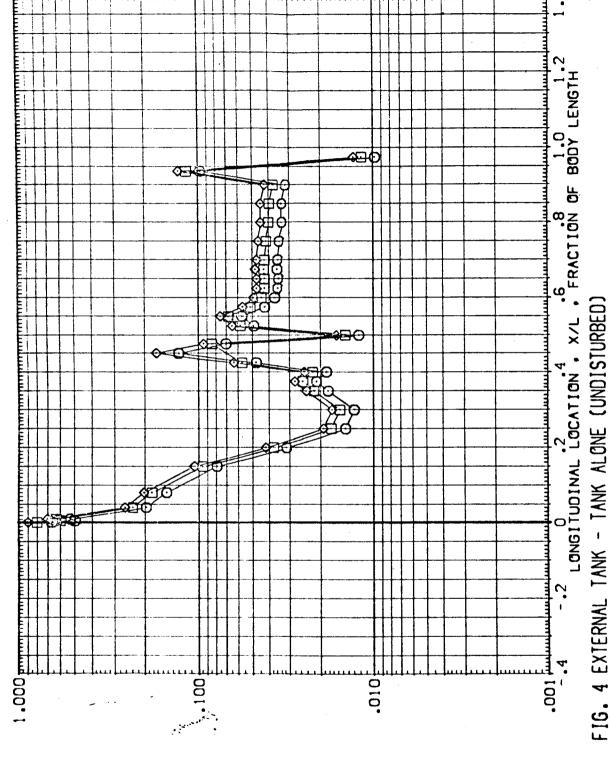
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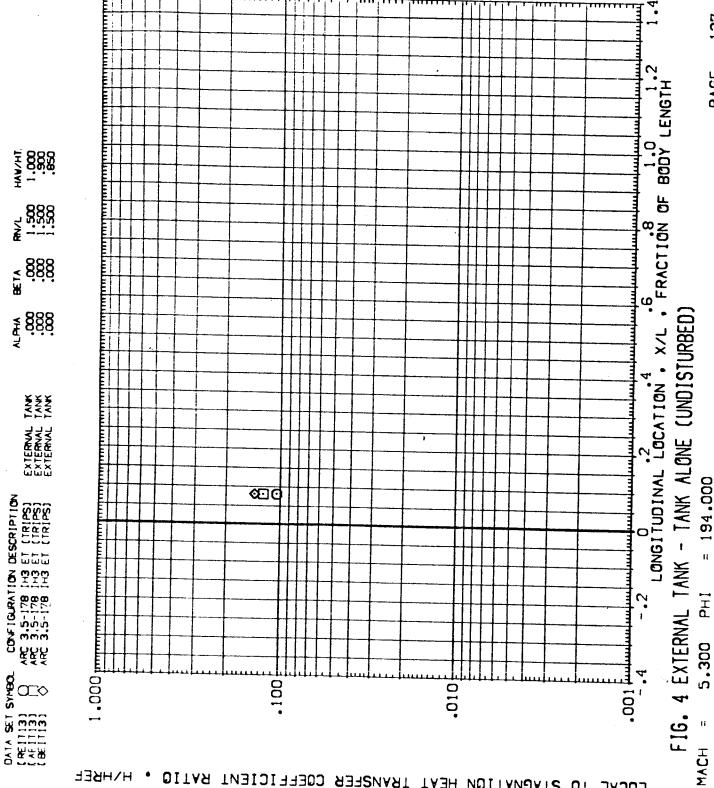
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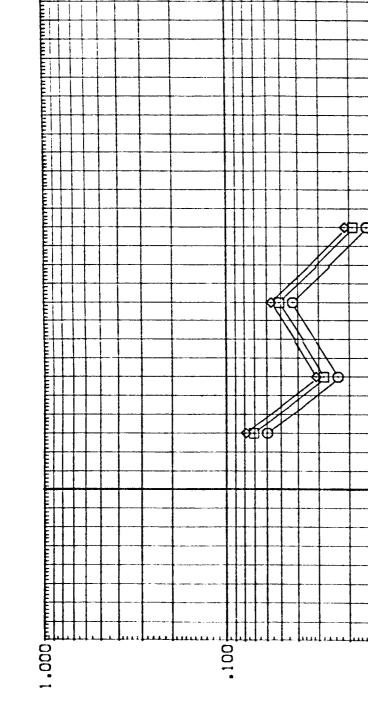
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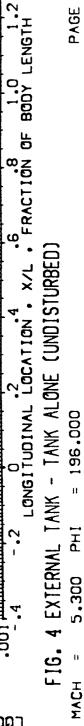
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EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK DESCRIPTION ET (TRIPS) ET (TRIPS) ET (TRIPS) ARC 3.5-178 1H3 E ARC 3.5-178 1H3 E ARC 3.5-178 1H3 E





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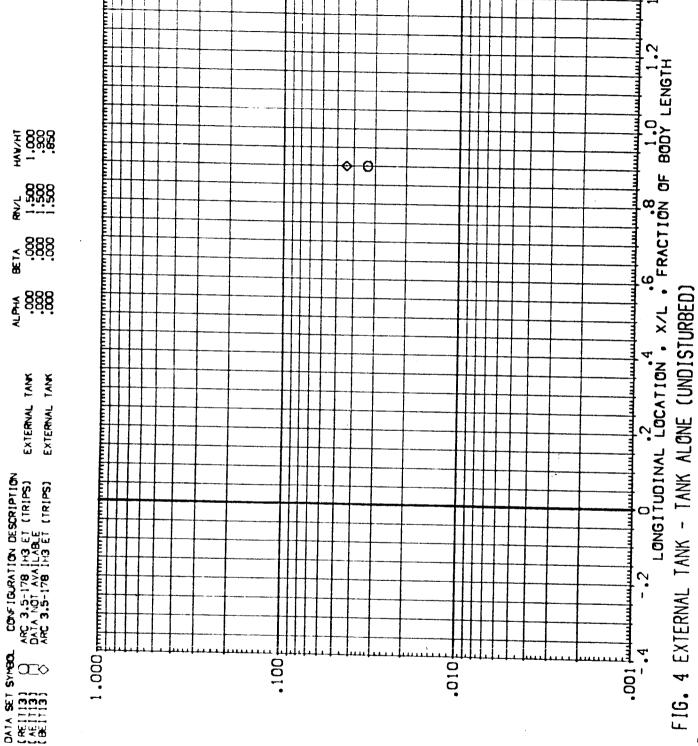
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FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

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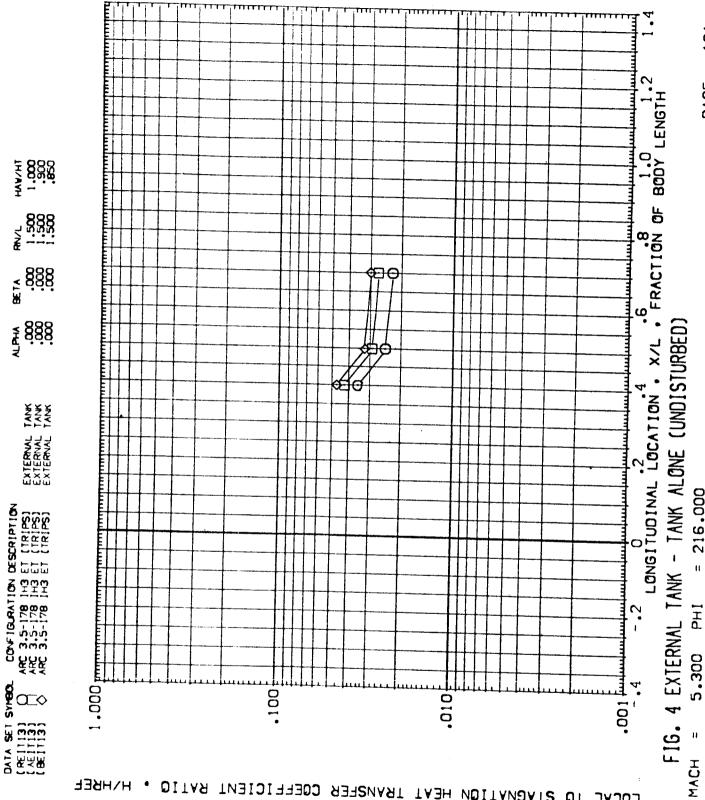
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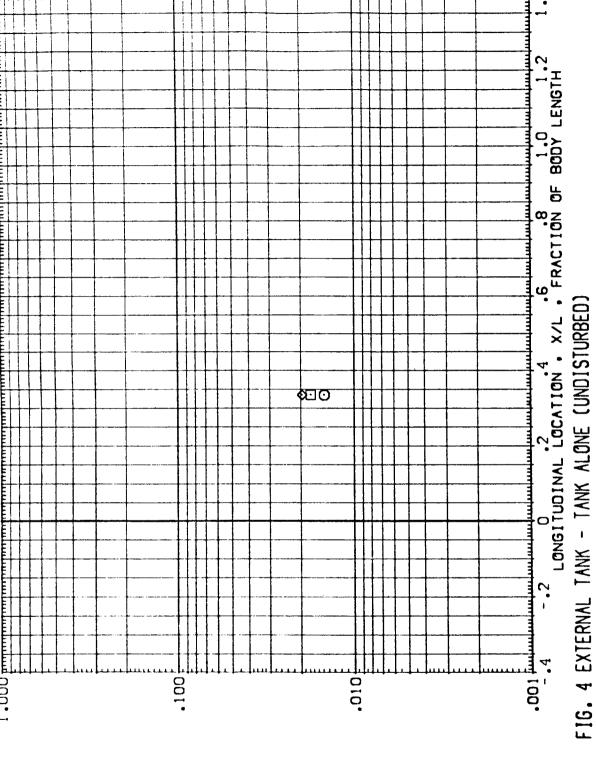
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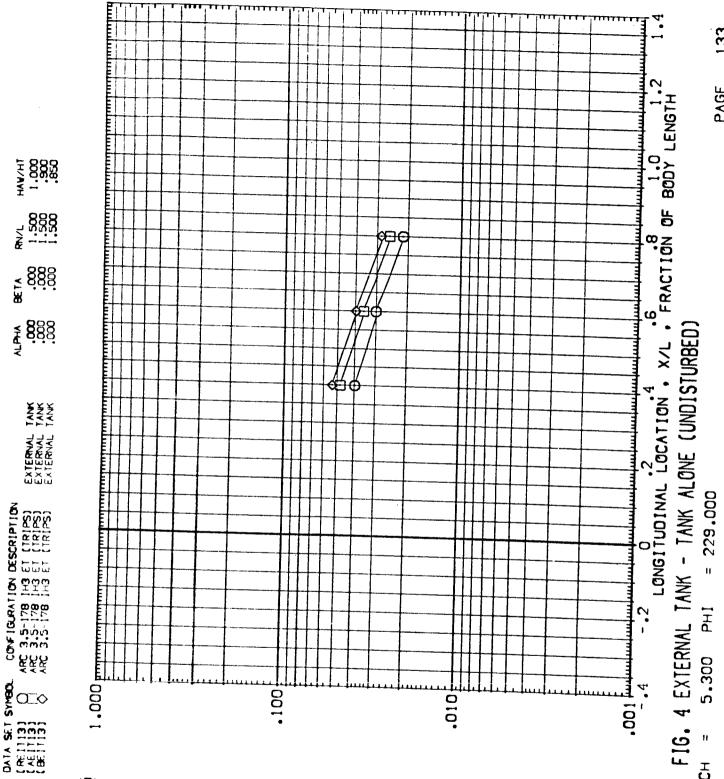
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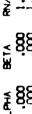
₹ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) **§** ○ □ ◇ DATA SET (RE1113) (AE1113) (BE1113)

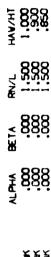


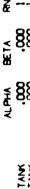


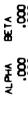


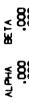


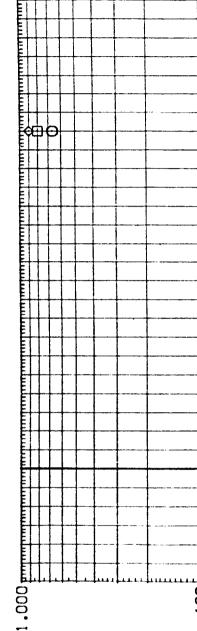


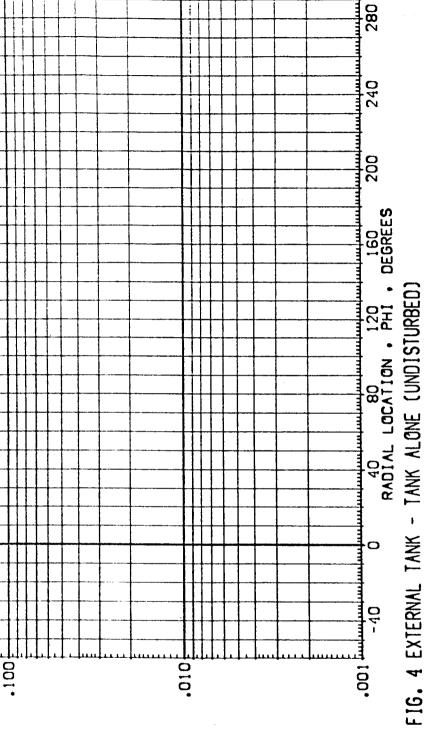












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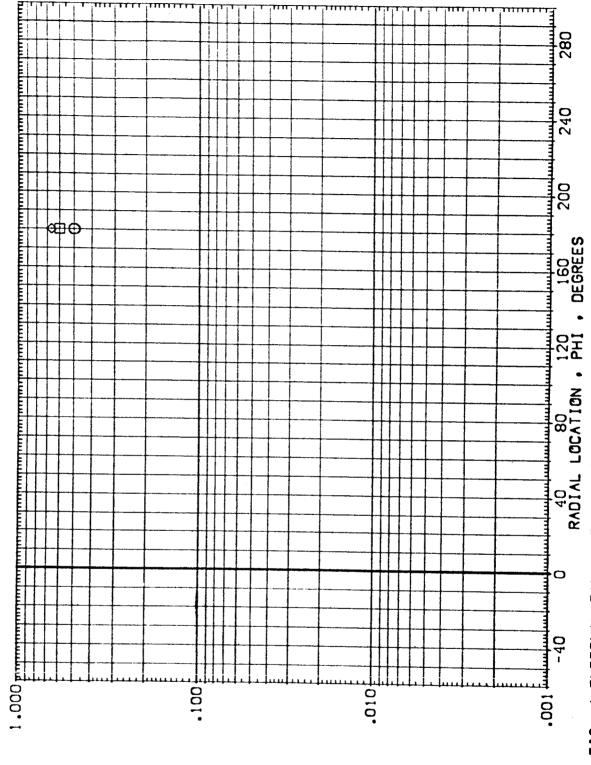
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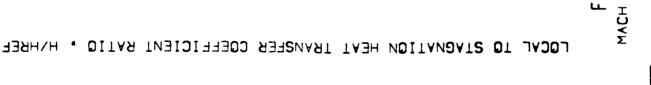
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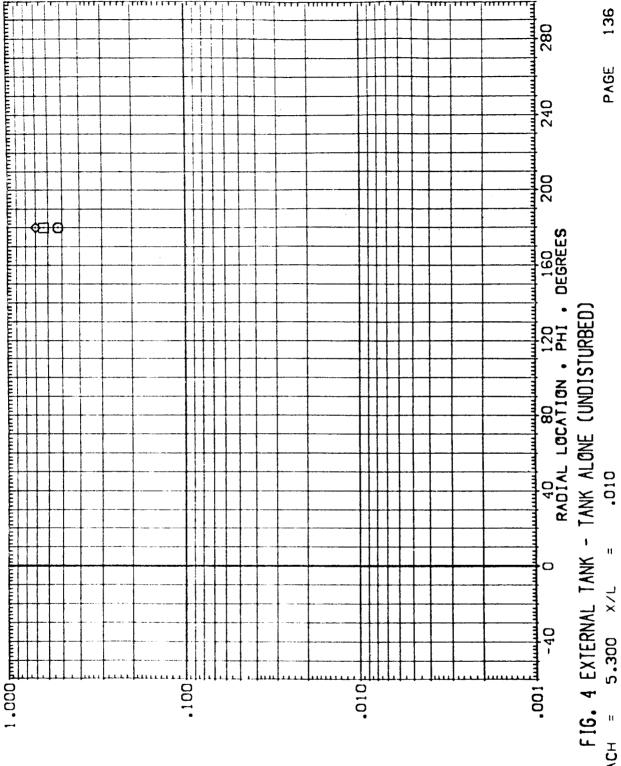




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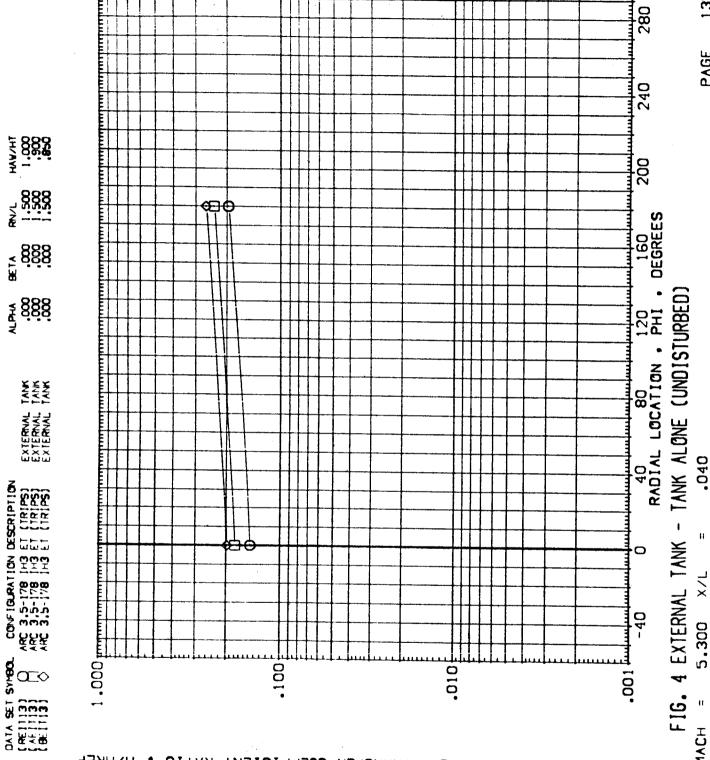
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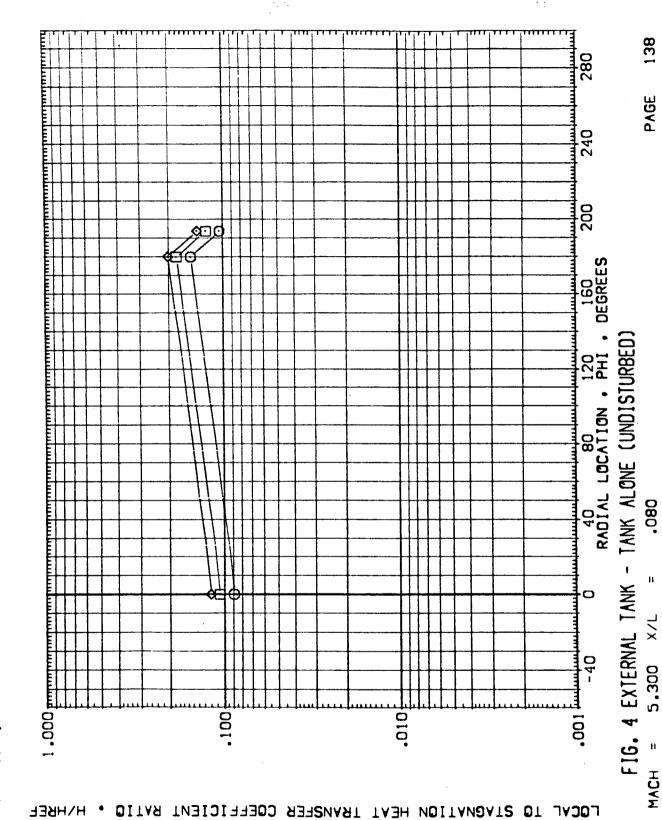


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FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

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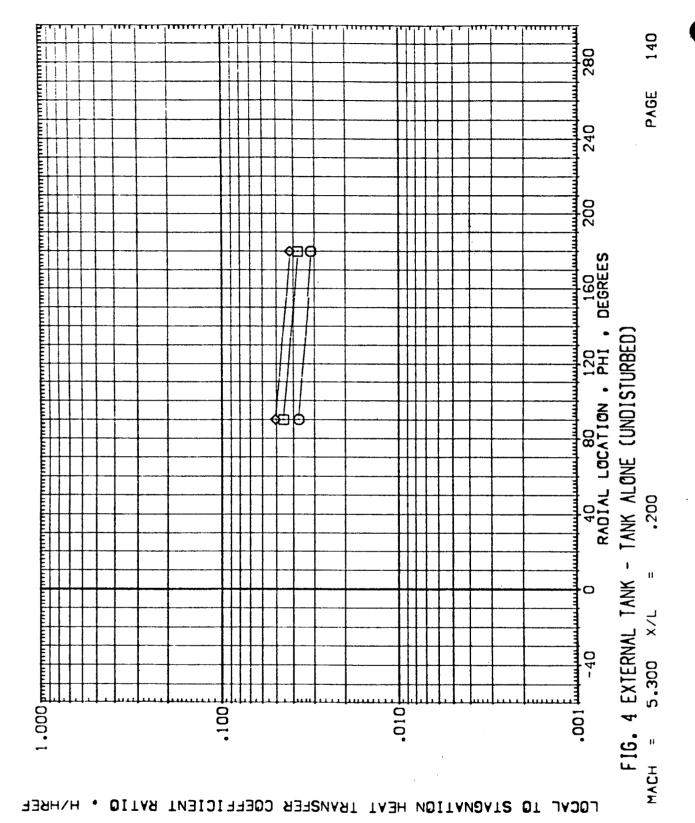
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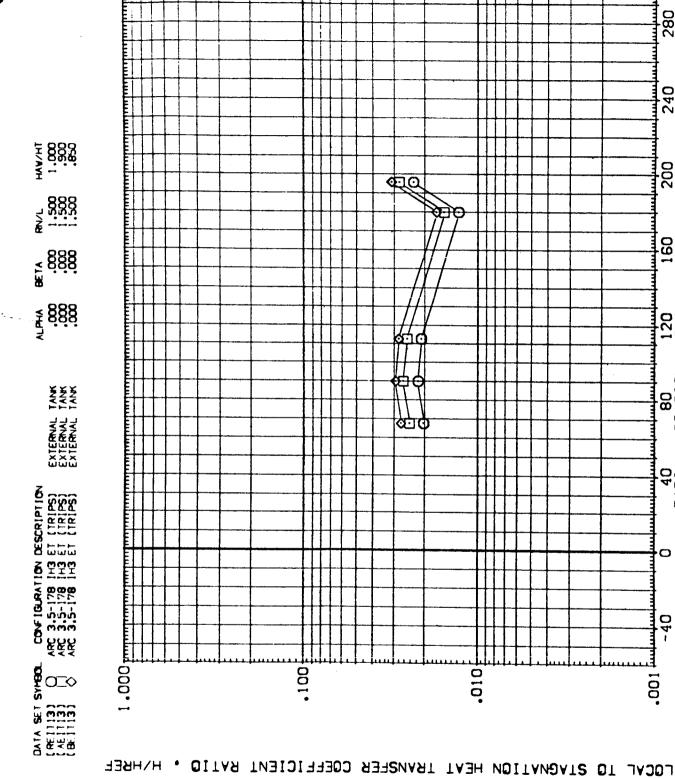
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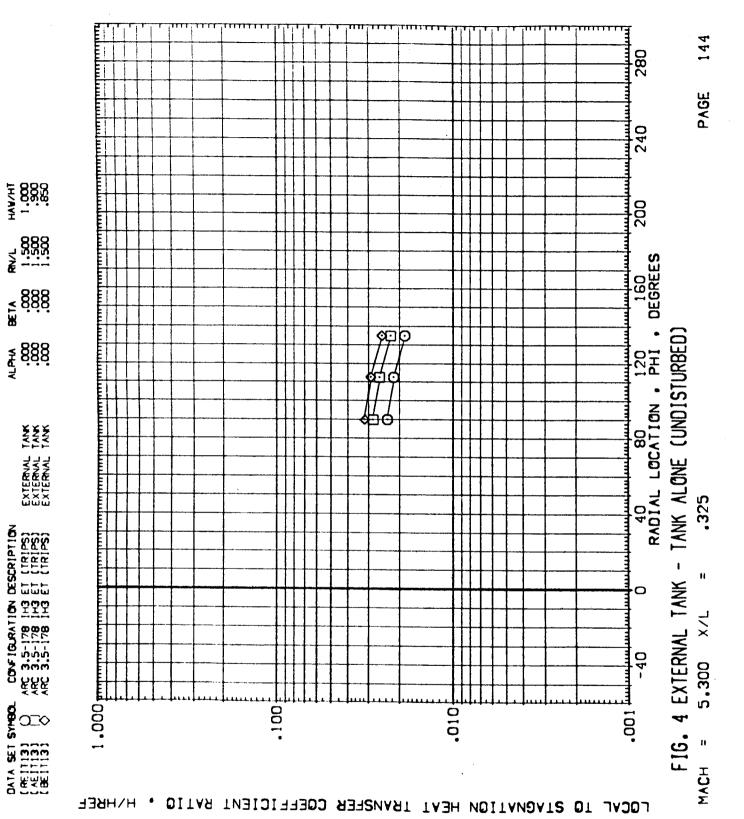
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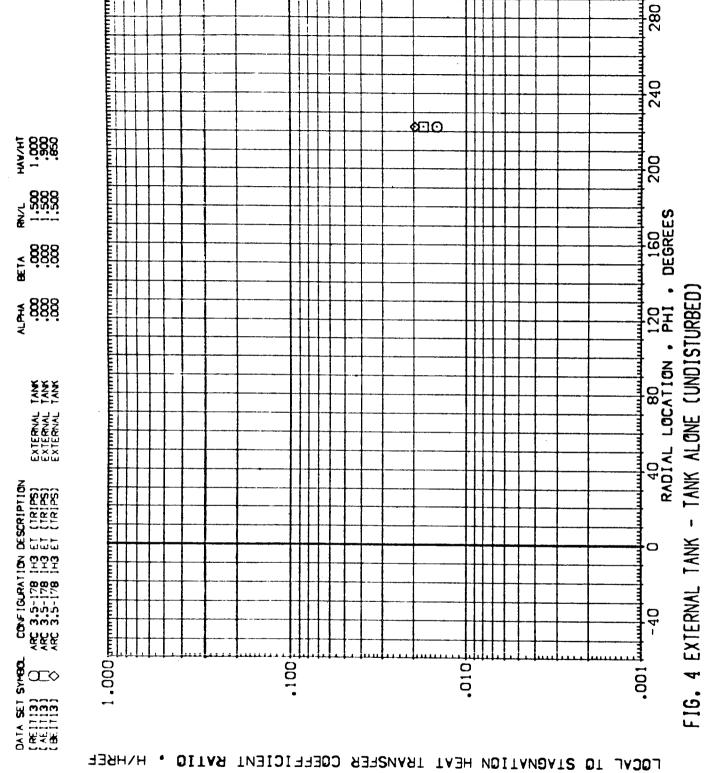
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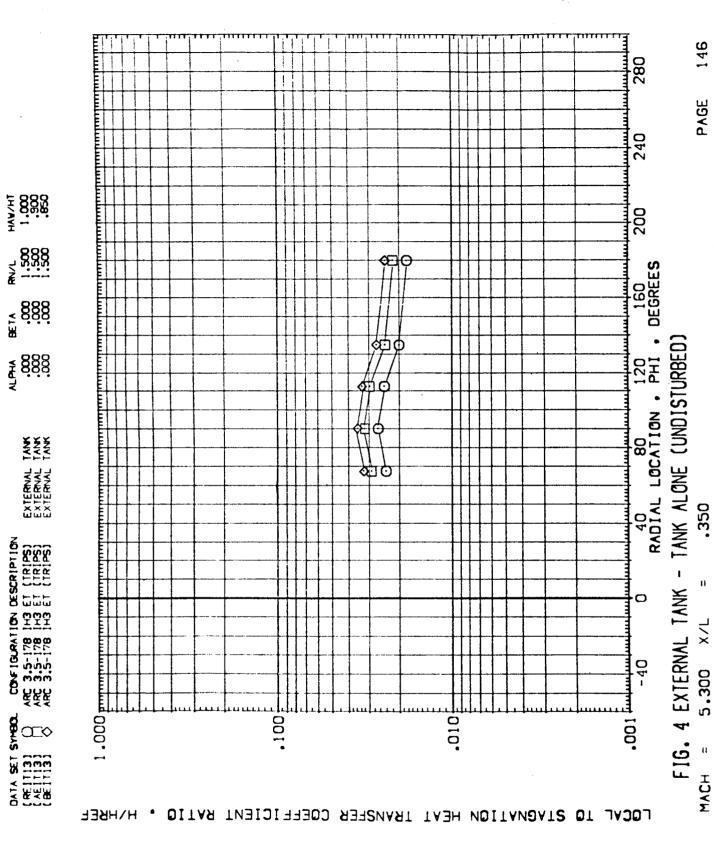


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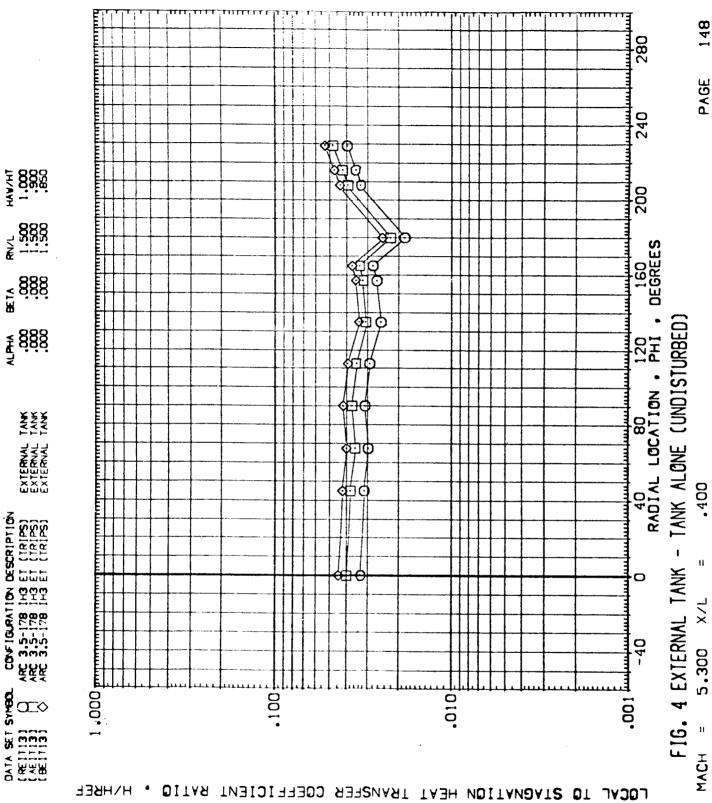
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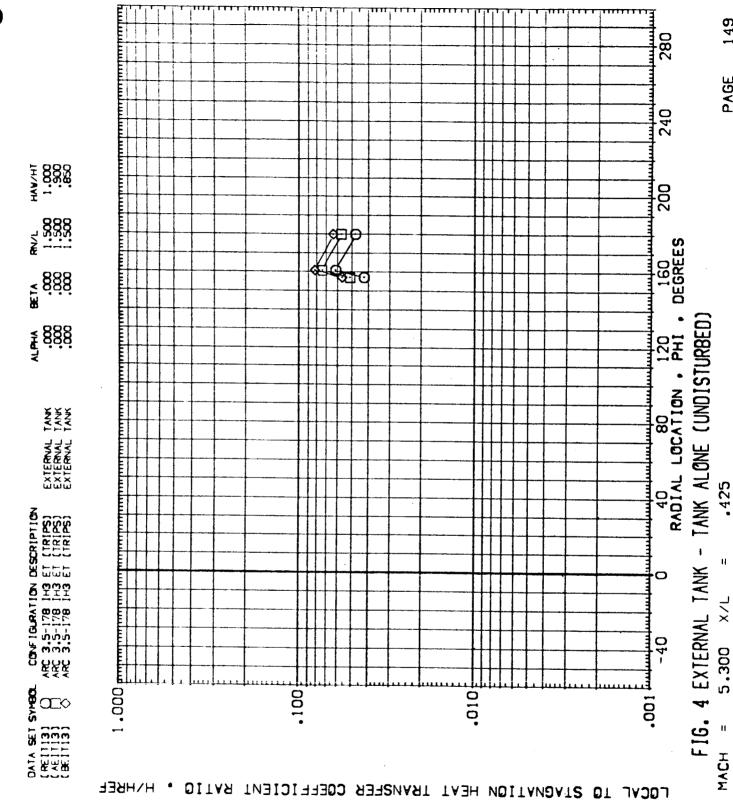


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280 PAGE 240 HAW/HI - 000 - 900 - 950 - 950 200 AO 80 120 160 RADIAL LOCATION • PHI • DEGREES **₩**0 Å 9866 0866 FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) -40 5,300 100 010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

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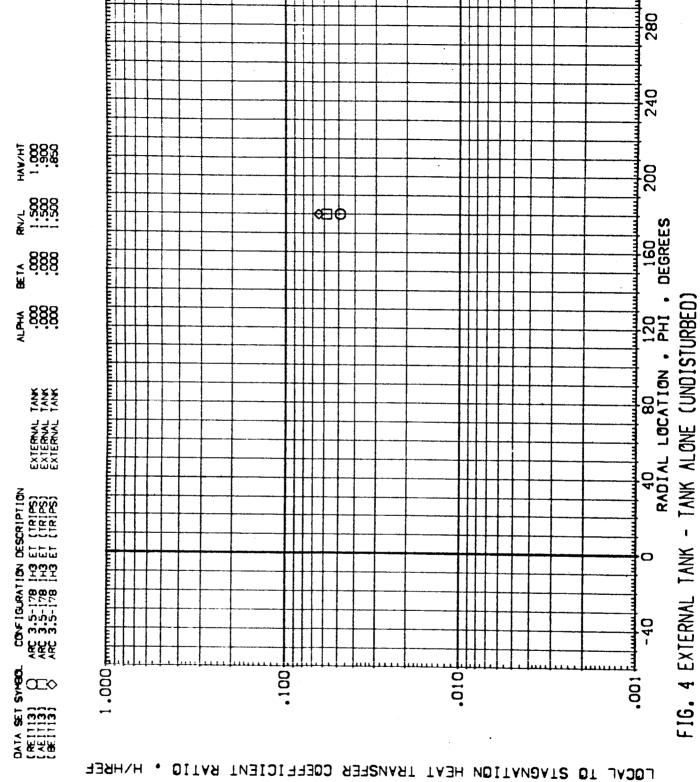
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FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) 5,300 MACH

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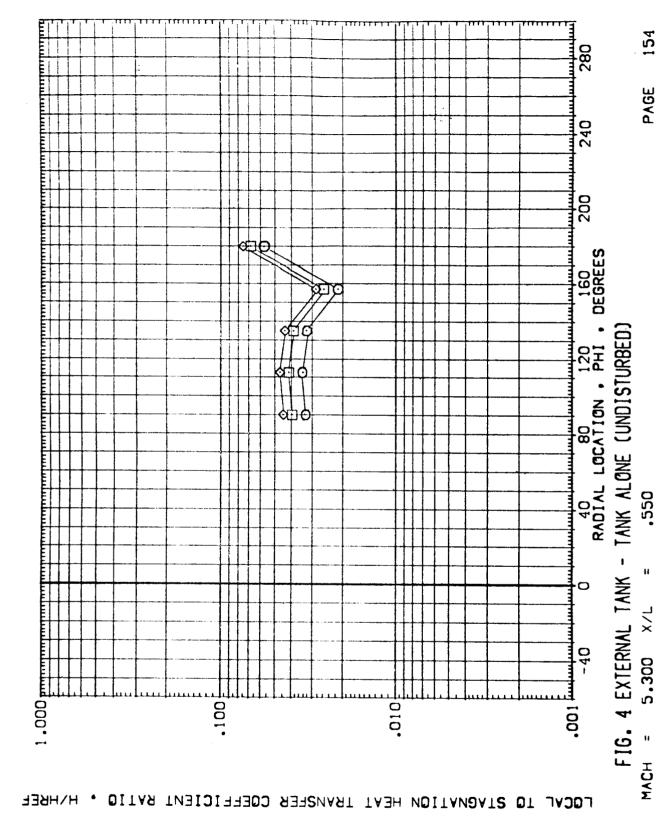
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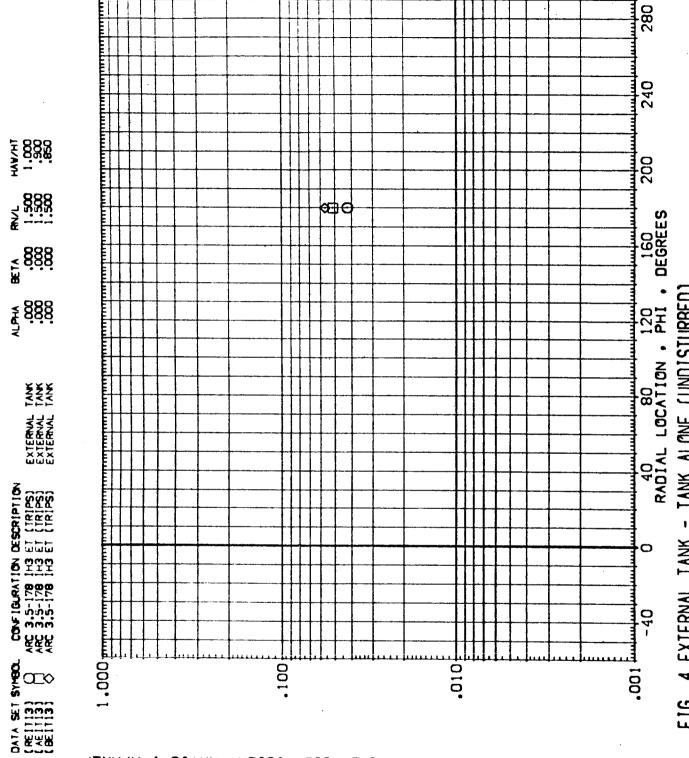
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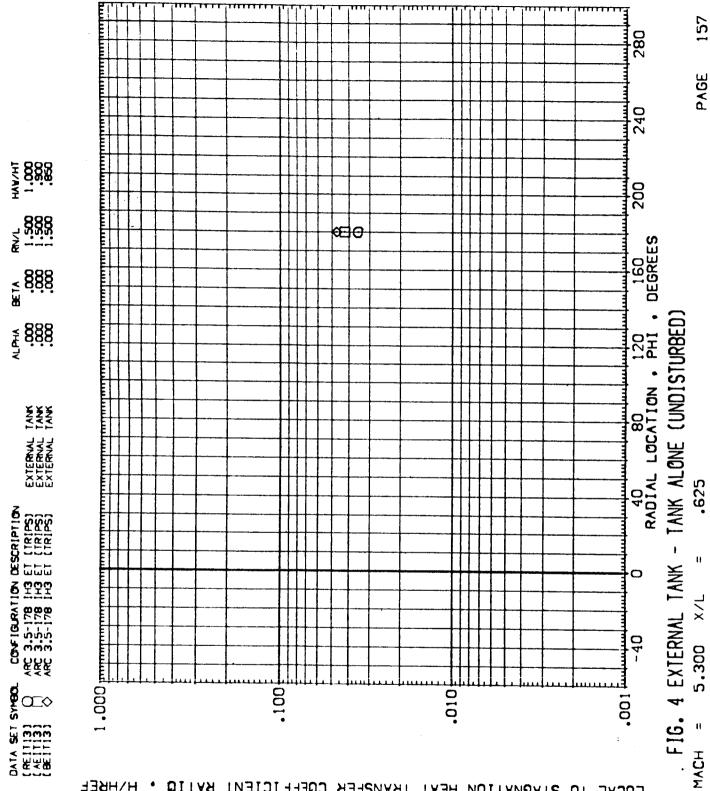
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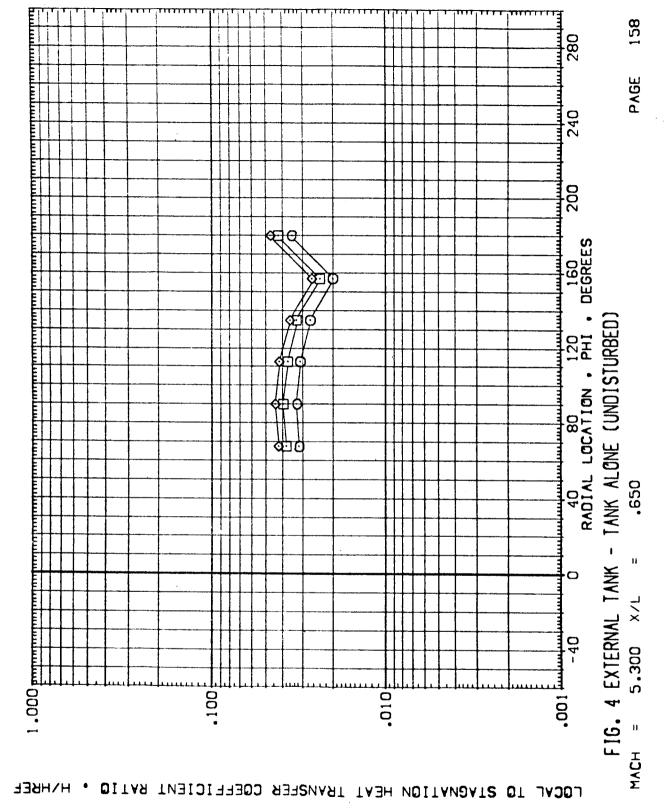
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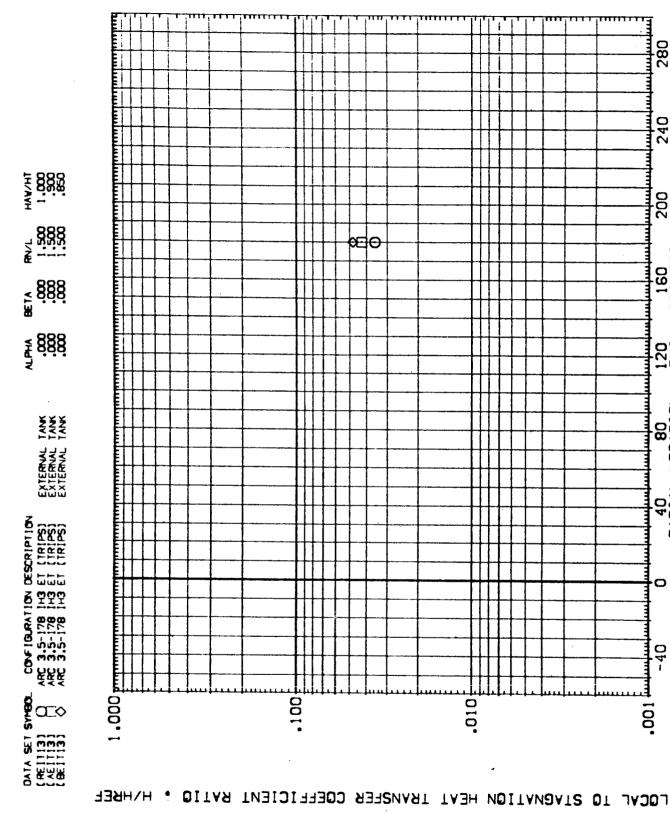
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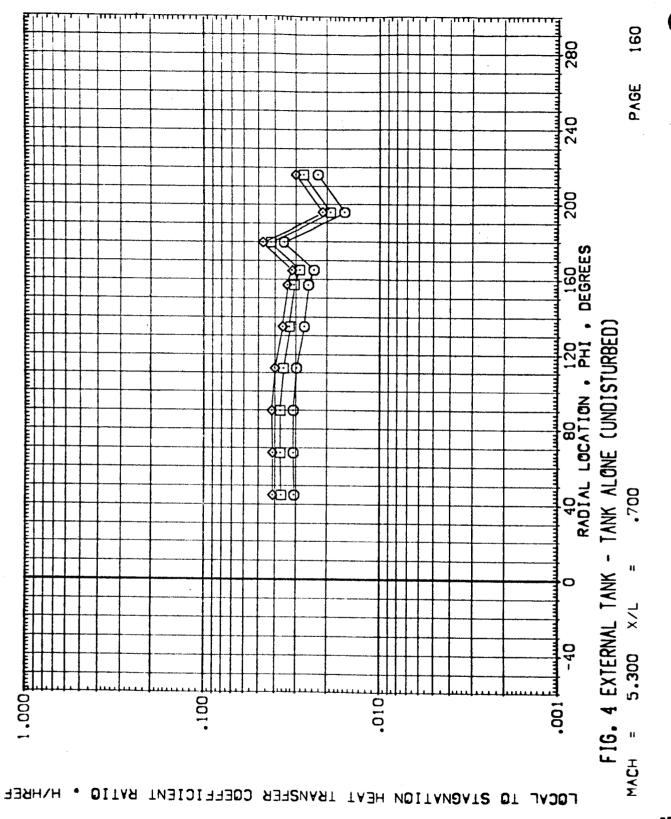
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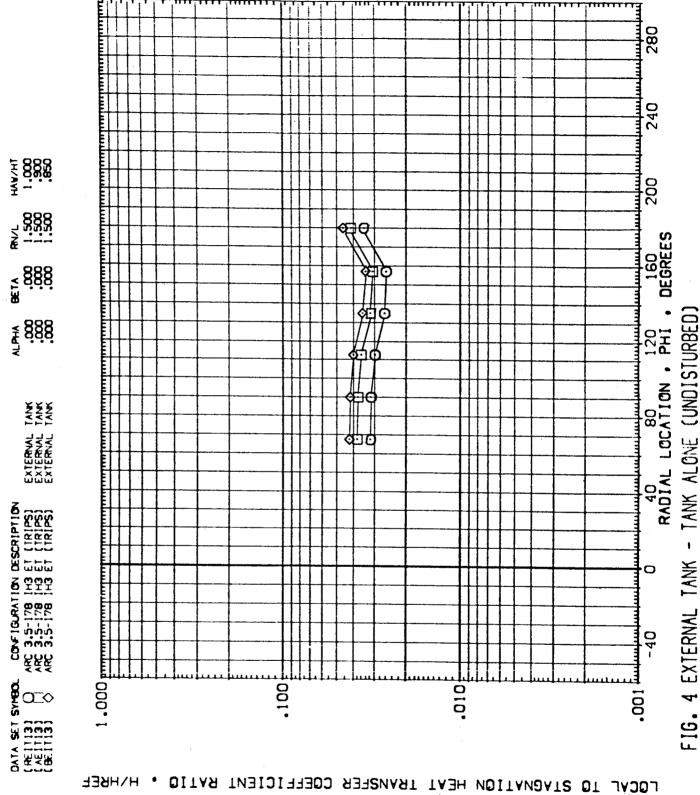
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



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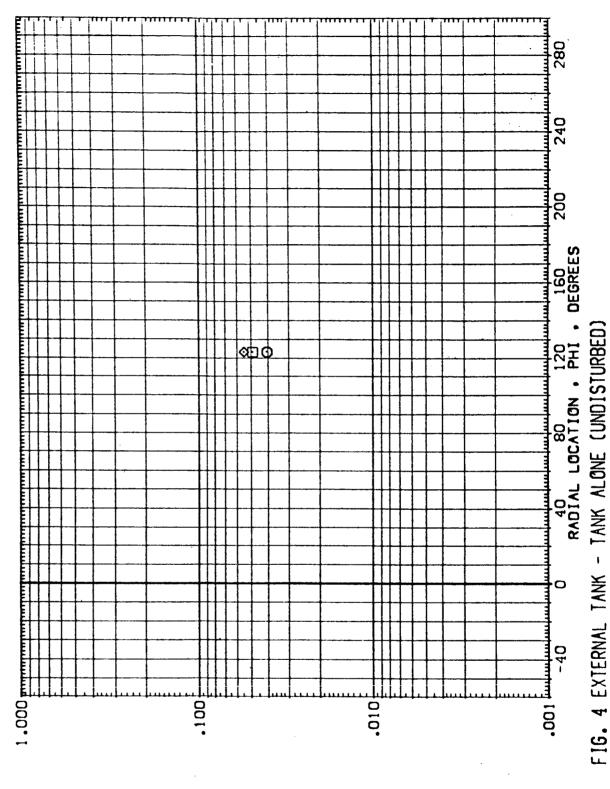
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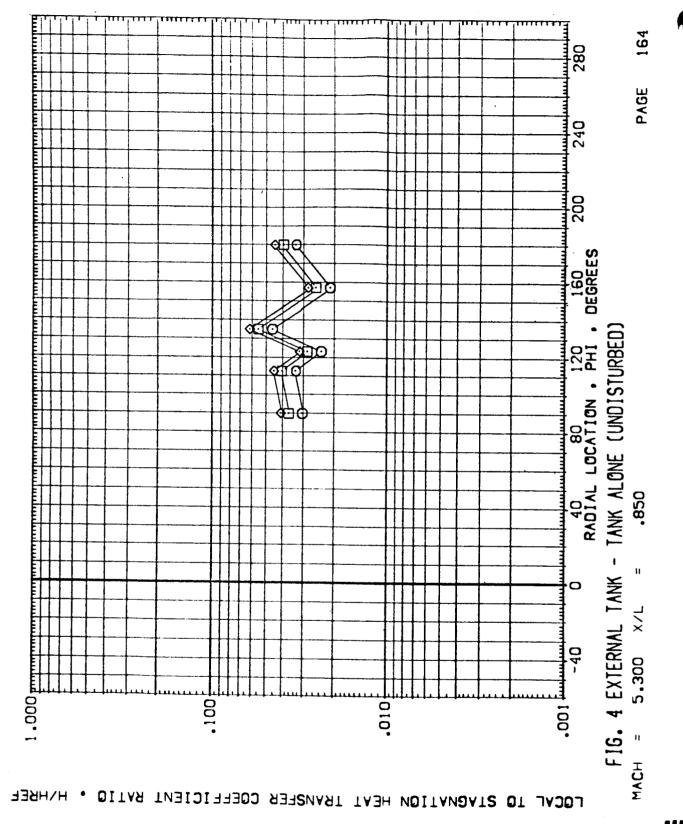
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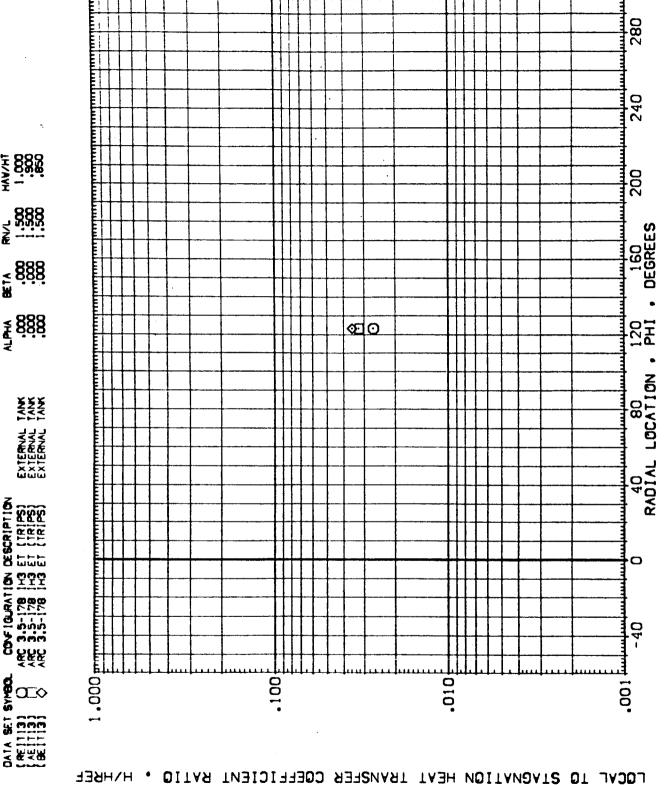


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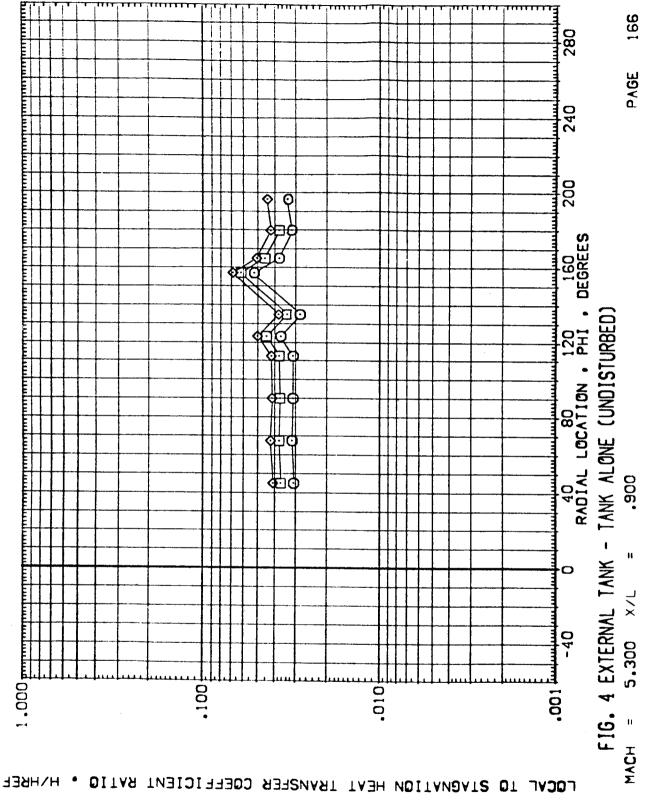








HAV/HT 0000-85000-85000-₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET ((RE1113) (AE1113) (BE1113)





167 280 PAGE 240 200 160 DEGREES AD 80 120 RADIAL LOCATION . PHI . Å 8668 8008 TANK ALONE (UNDISTURBED) EXTERNAL 1 EXTERNAL 1 EXTERNAL 1 .925 CONFIGURATION DESCRIPTION ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) ı 11 FIG. 4 EXTERNAL TANK 0 -40 5,300 0A1A SET SYMBOL (AE1113) C (AE1113) C (BE1113) .100 .010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

168 280 PAGE 240 RADIAL LOCATION • PHI • DEGREES **⊘** FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) .935 5.300 100 .010 MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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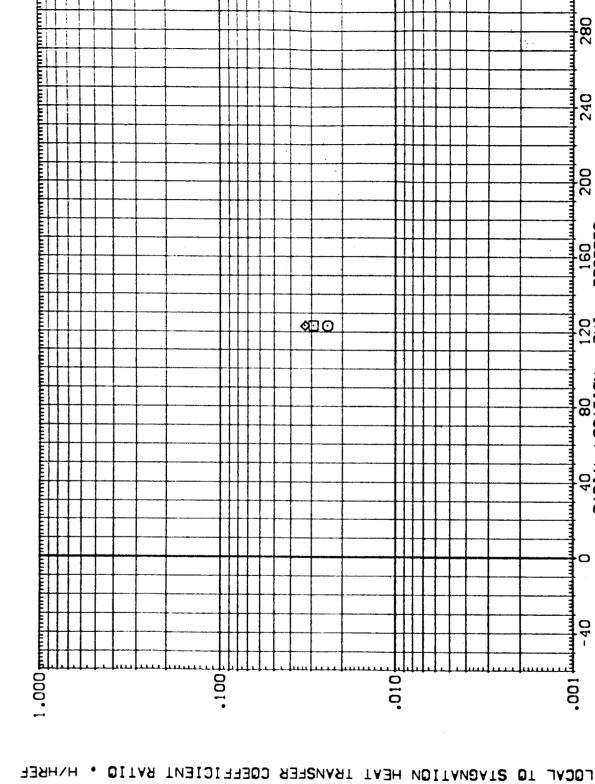
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

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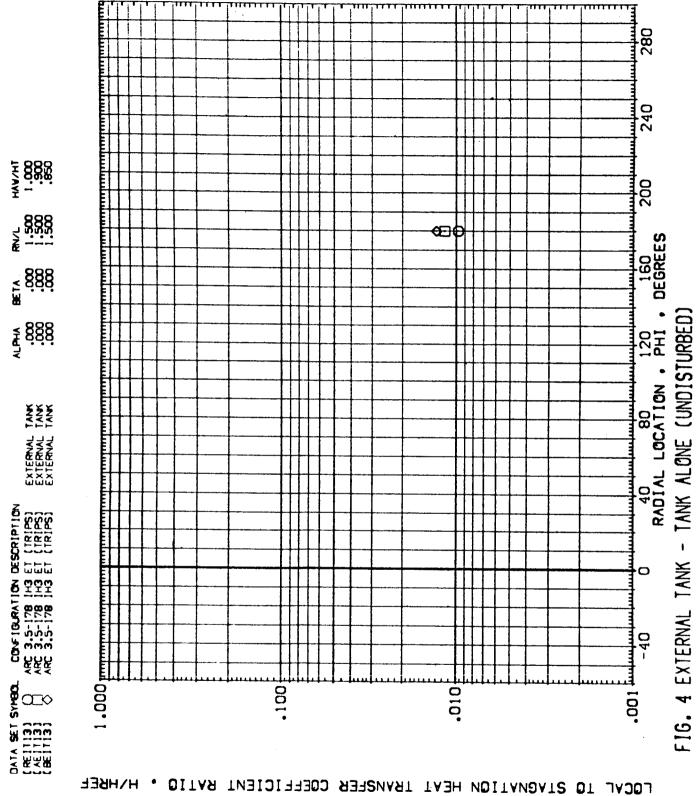
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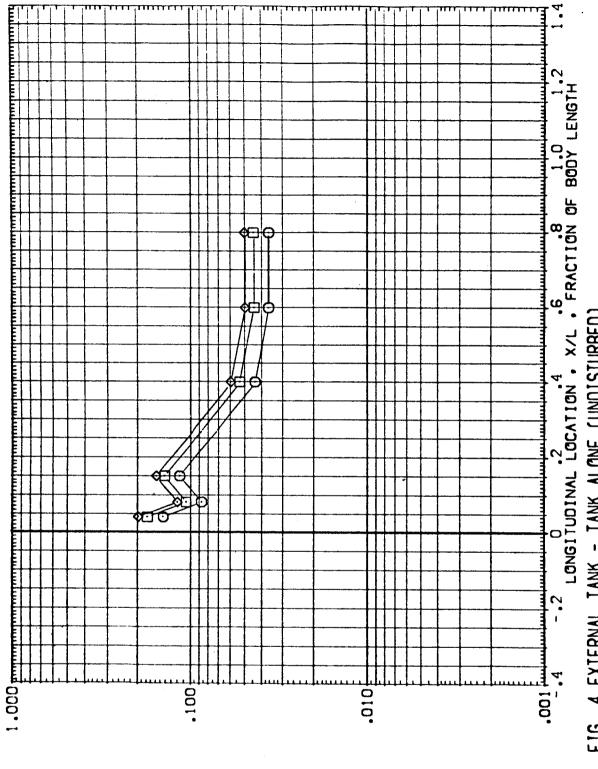
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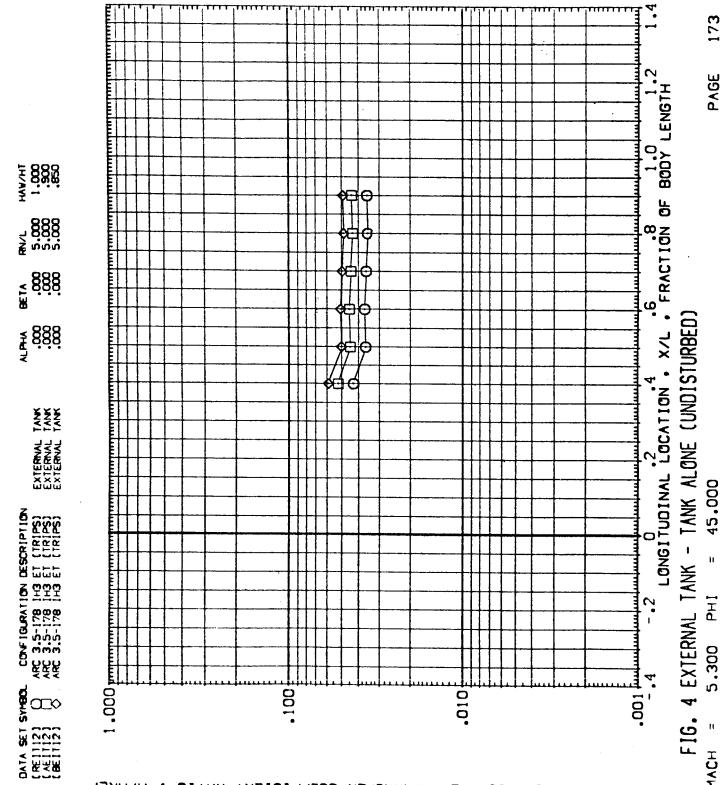
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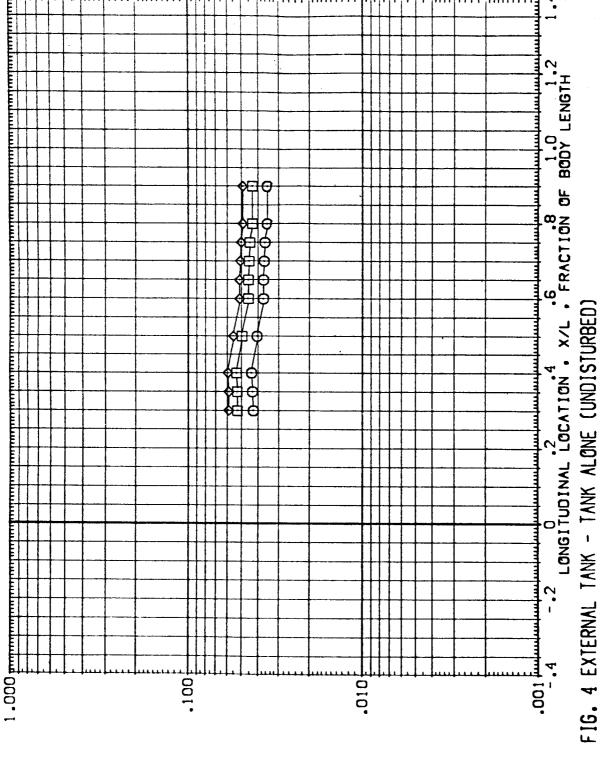
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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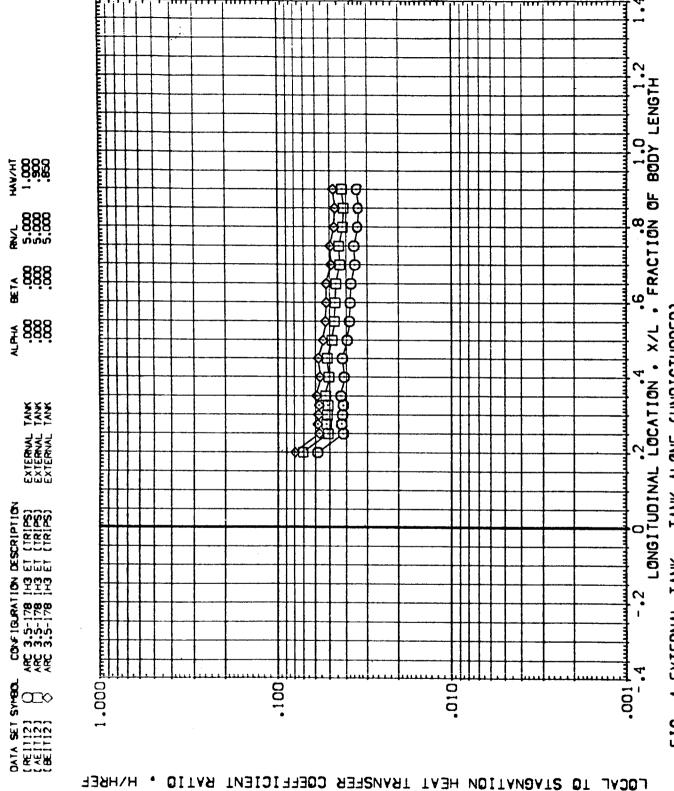


FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

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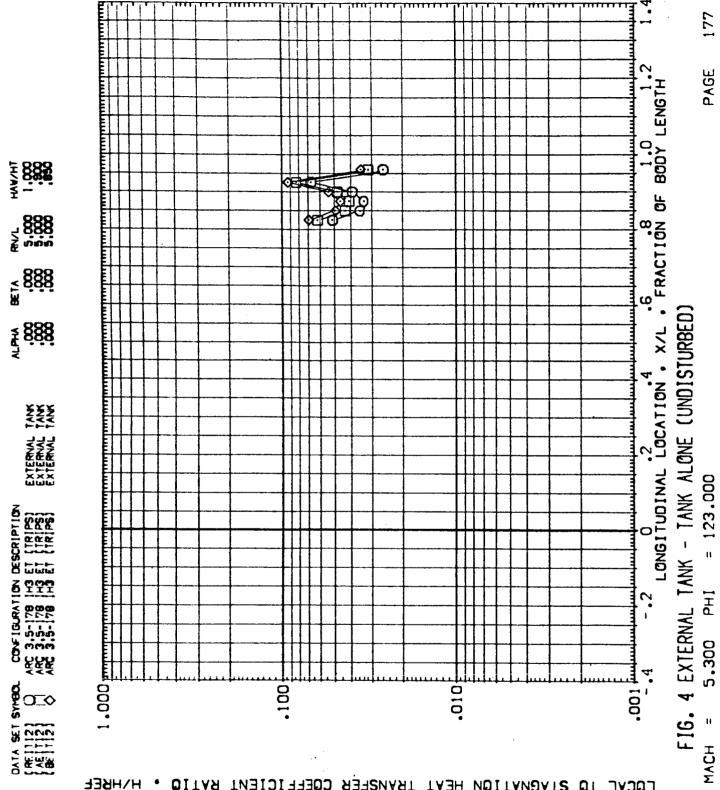
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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

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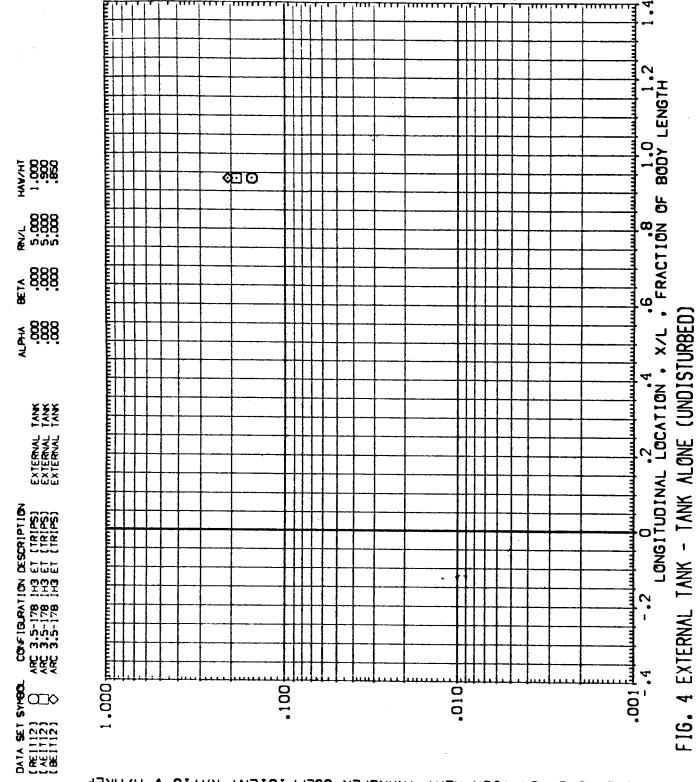
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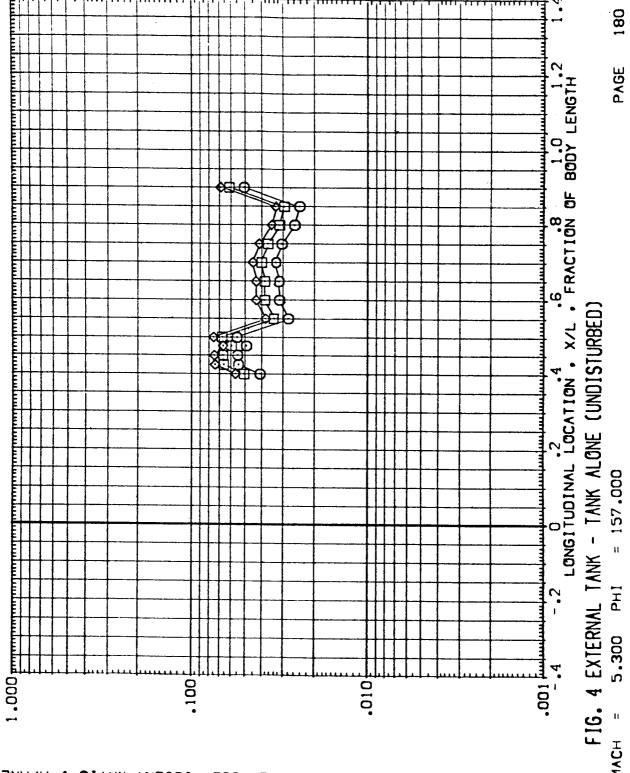
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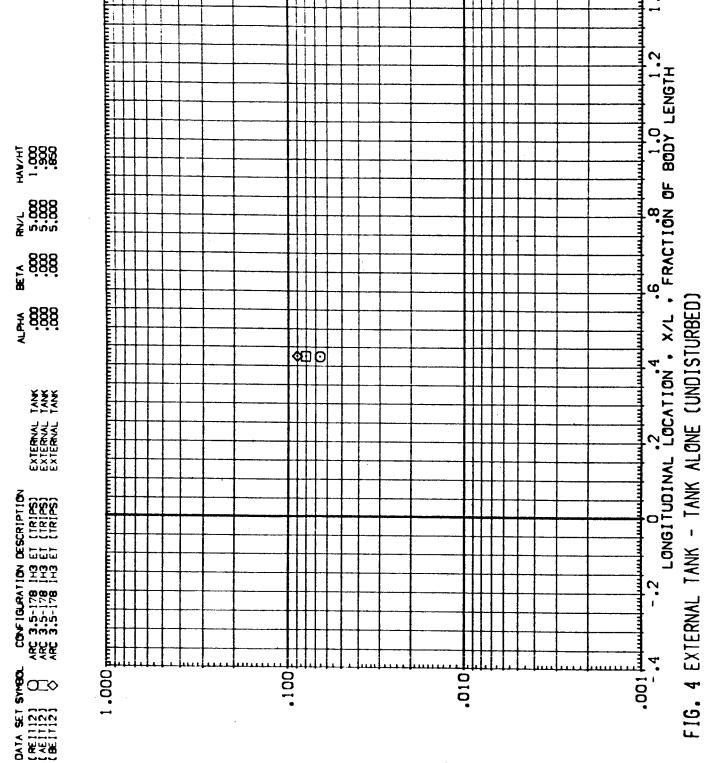


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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) .001 Fun-

FOCYF 10 STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



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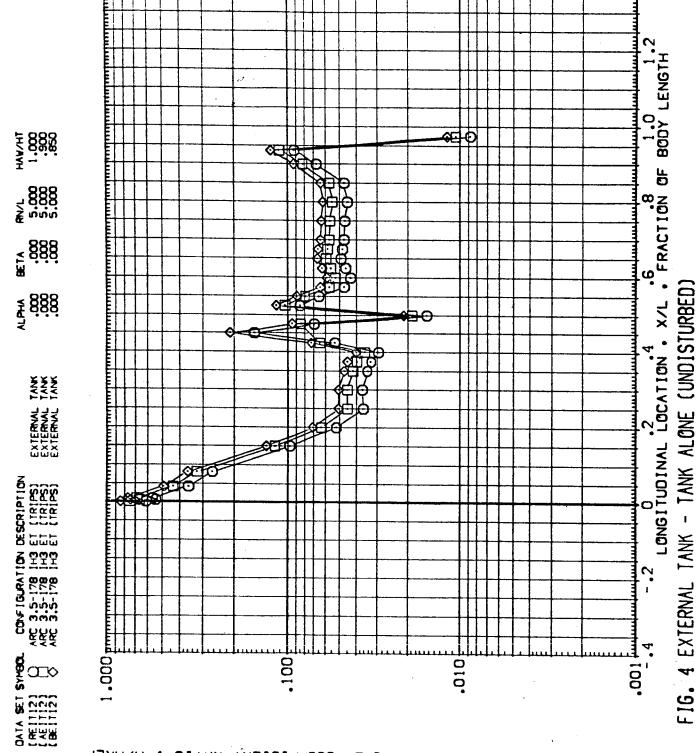
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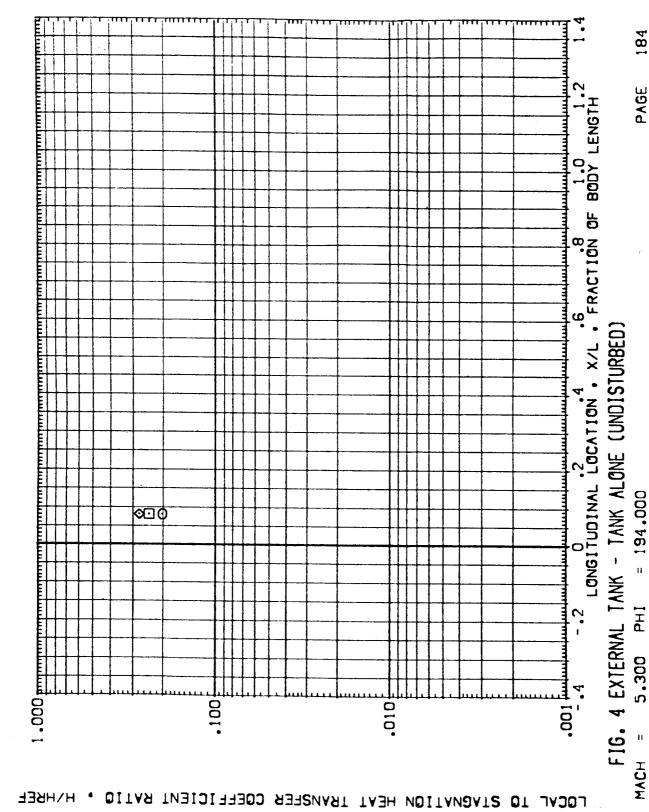
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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[RE1112]

[AE1112]

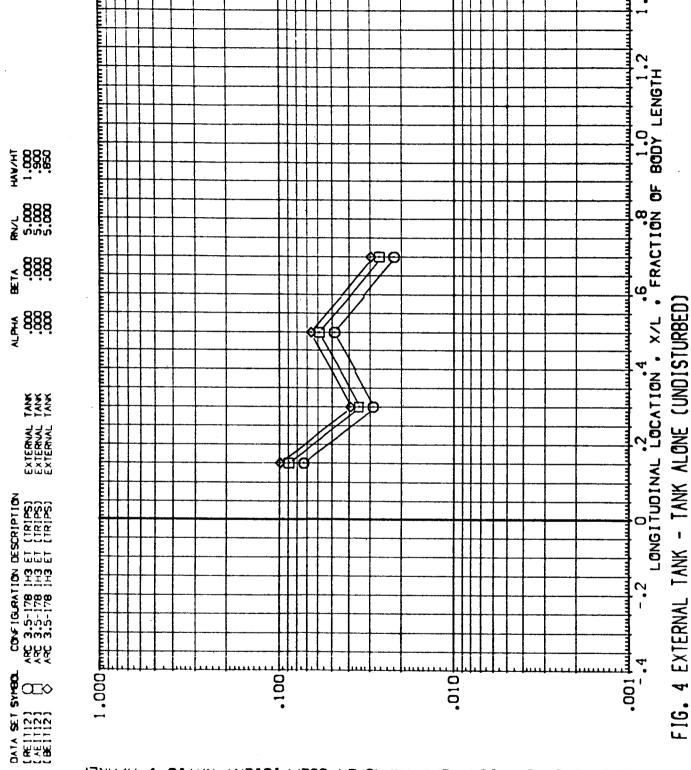
[BE1112]





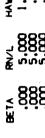
= 196.000

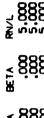
5,300

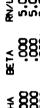


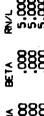
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



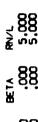


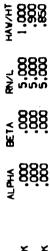


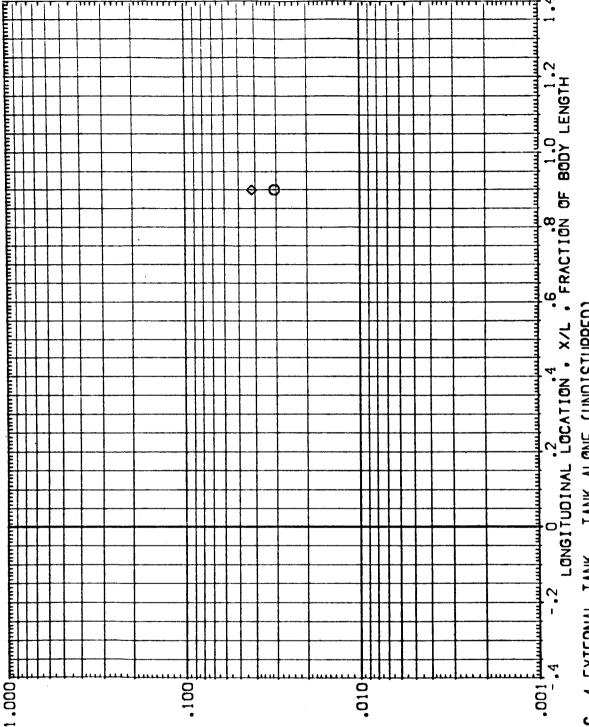












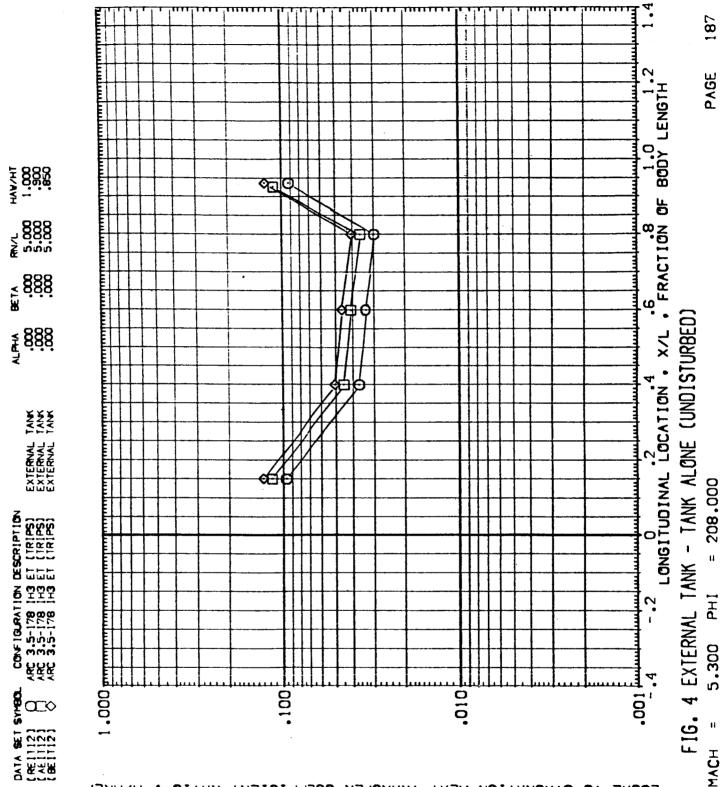
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO , HAHREF

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

PH.

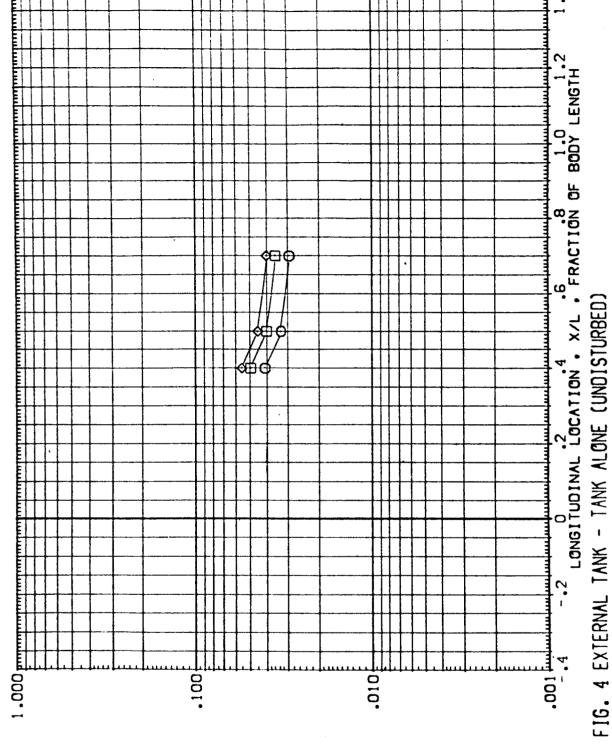
5.300

MACH



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ ოოო 7 888 888 # 888 888 ₹ \$888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYMBO. (RE1112) (AE1112) (BE1112)



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

FIG. 4 EXTERNAL TANN - TANN ALUI MACH = 5.300 PHI = 216.000



FOCYF 10 STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)

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¥ 888 COVE IGLRATION DESCRIPTION ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) DATA SET SYNBOL (RE1712) (AE1712)

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER



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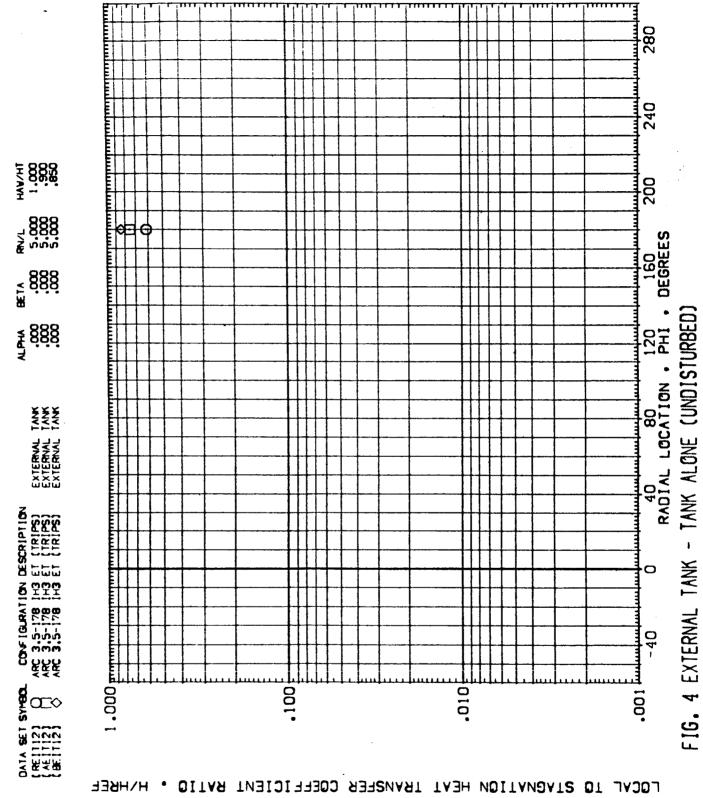
229,000

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DH.

5,300

MACH



.

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[RE1112] ○ ARC 3.5-178 | H3 ET (TRIPS) EXTERNAL TANK

[AET112] ○ ARC 3.5-178 | H3 ET (TRIPS) EXTERNAL TANK

[BET112] ◇ ARC 3.5-178 | H3 ET (TRIPS) EXTERNAL TANK

H/WH 0000 85000 85000

₹ 889 888

¥ 888

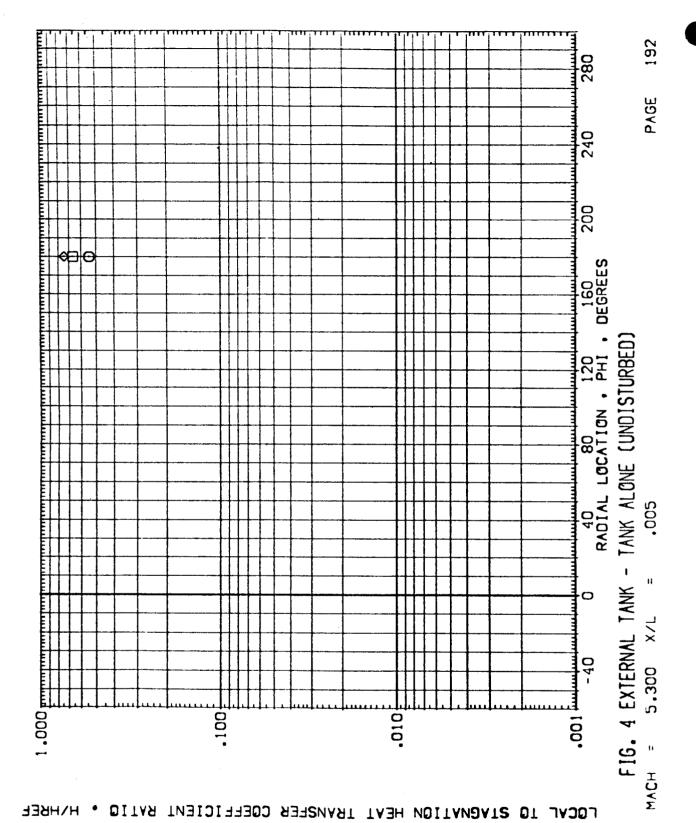
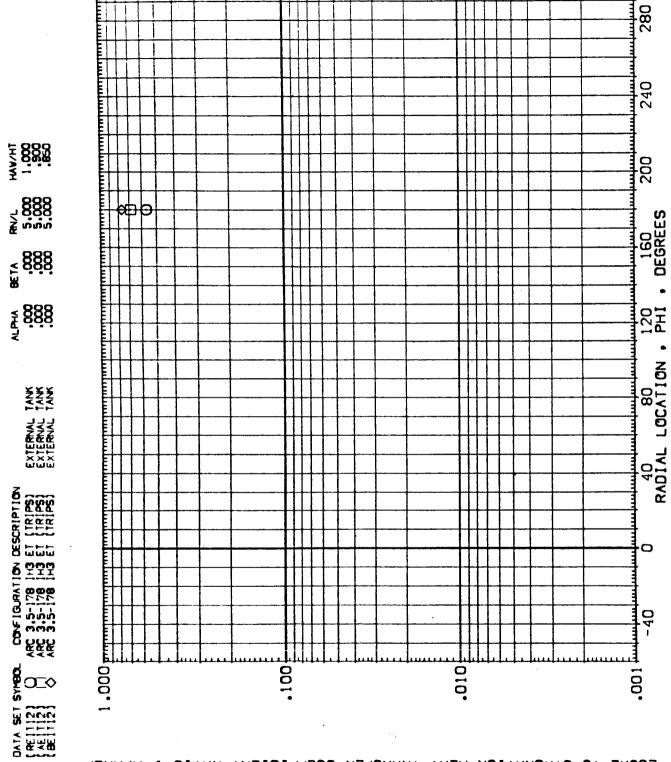




FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED)
H = 5.300 ×/L = .010

5,300

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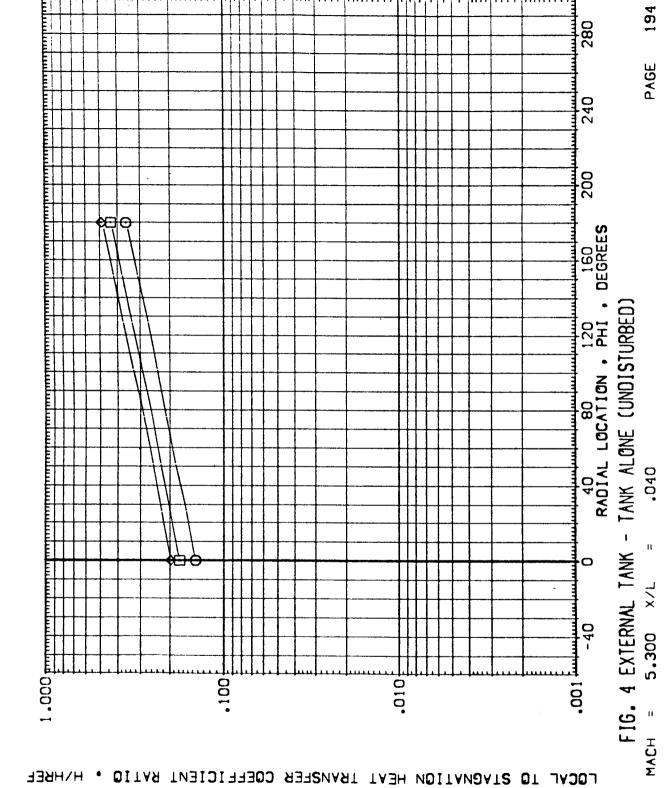
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

HAYH 000.9 800.8 ₹ %%% 9000 9000 9000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYMBO.

(RE1112)

(AE1112)

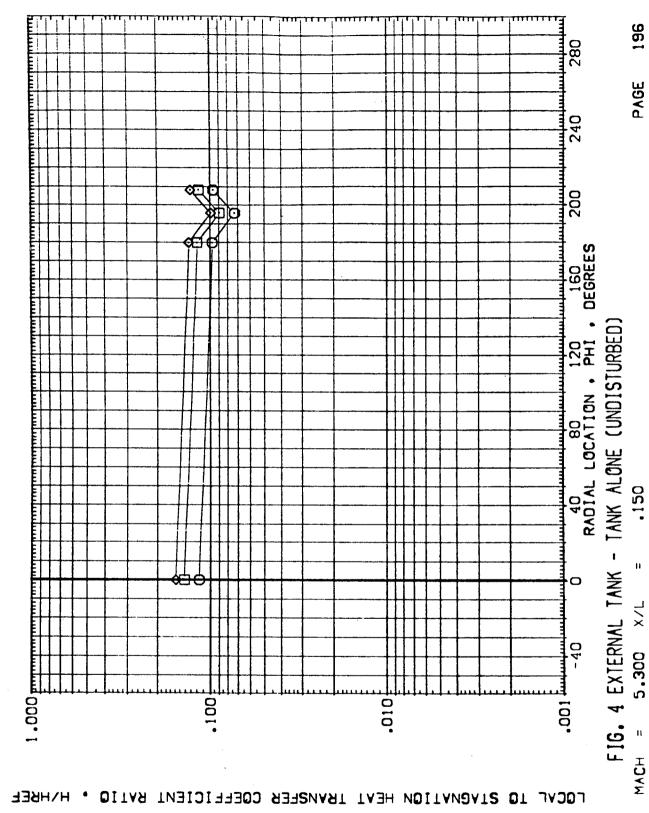
(BE1112)





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

1.000 1.000 1.000 1.000 1.000 ₹ ოოო 988 988 # 888 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS)

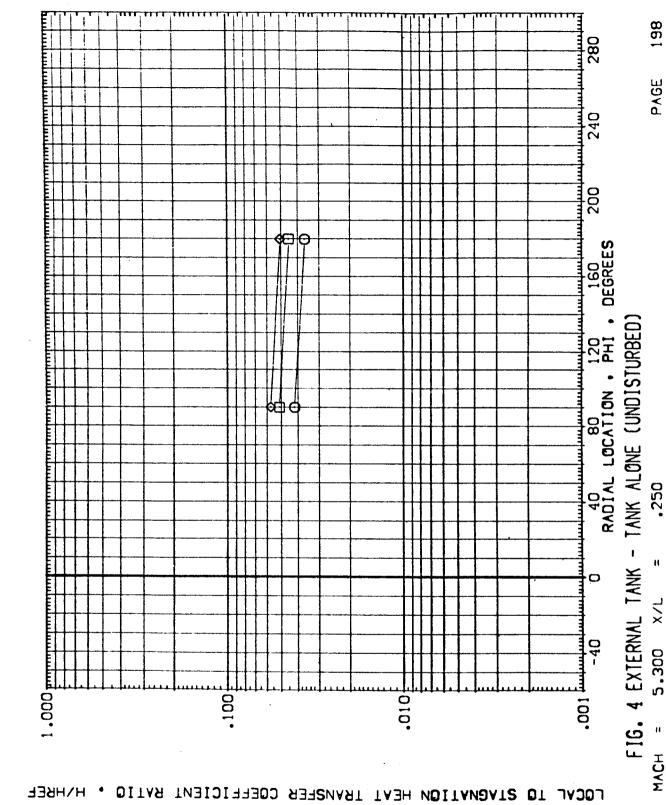




197 280 PAGE H 000.0 A0 80 120 160 RADIAL LOCATION . PHI . DEGREES # ₹ 888 FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) ₹ 9888 9888 EXTERNAL EXTERNAL EXTERNAL CONFIGURATION DESCRIPTION OF 3.5-178 IH3 ET (TRIPS) C 3.5-178 IH3 ET (TRIPS) C 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | SET SYMBOL .100 010 .00 ١ DATA SET (RE1112) (AE1112) (BE1112) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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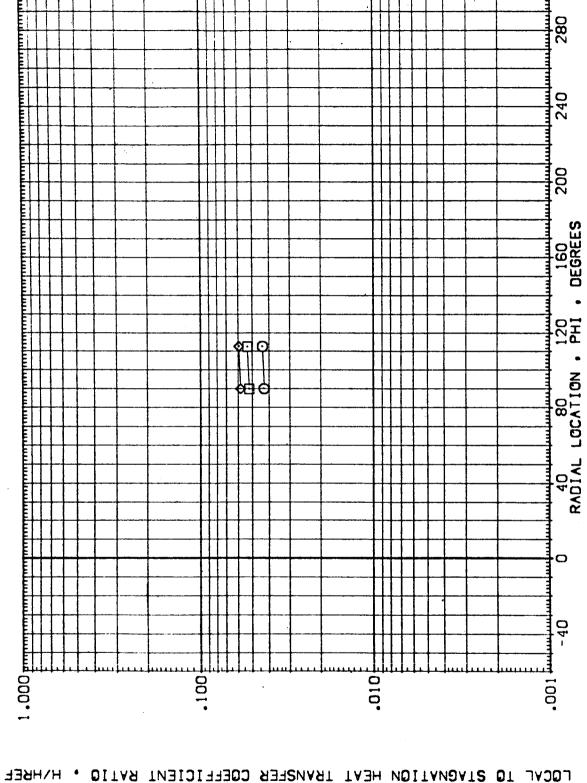
(RE11123 O
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DATA SET SYMBOL CONFIGURATION DESCRIPTION

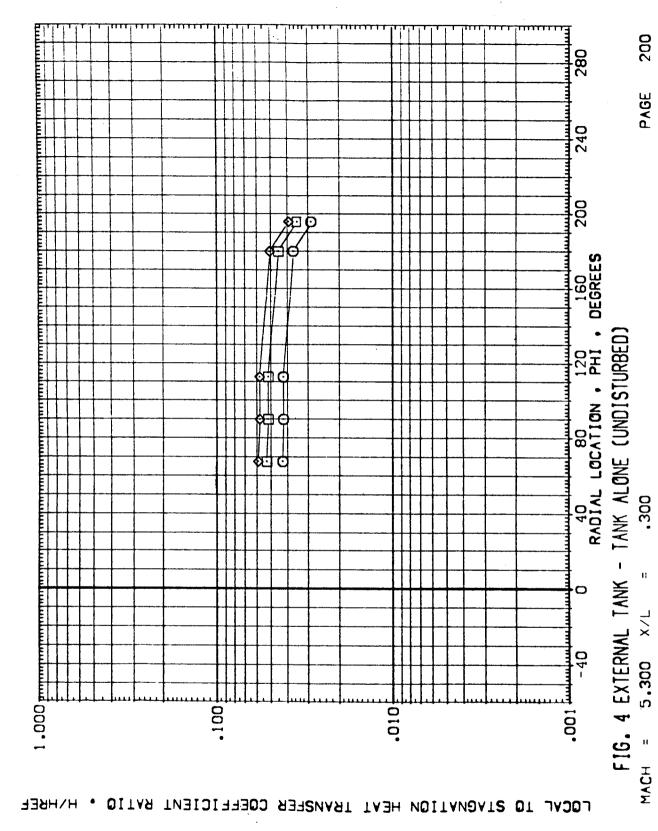
(RE1112) ARC 3.5-178 1H3 ET (TRIPS) EXTERNAL TANK .000 .000

(AE1112) ARC 3.5-178 1H3 ET (TRIPS) EXTERNAL TANK .000 .000

(BE1112) ARC 3.5-178 1H3 ET (TRIPS) EXTERNAL TANK .000 .000

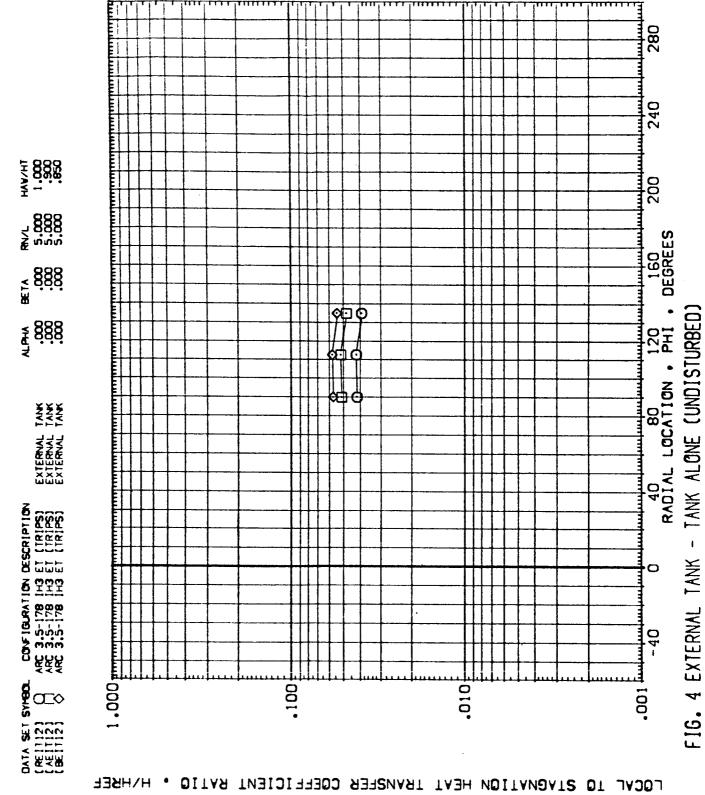
H/4/1

₹ ოო 988 988

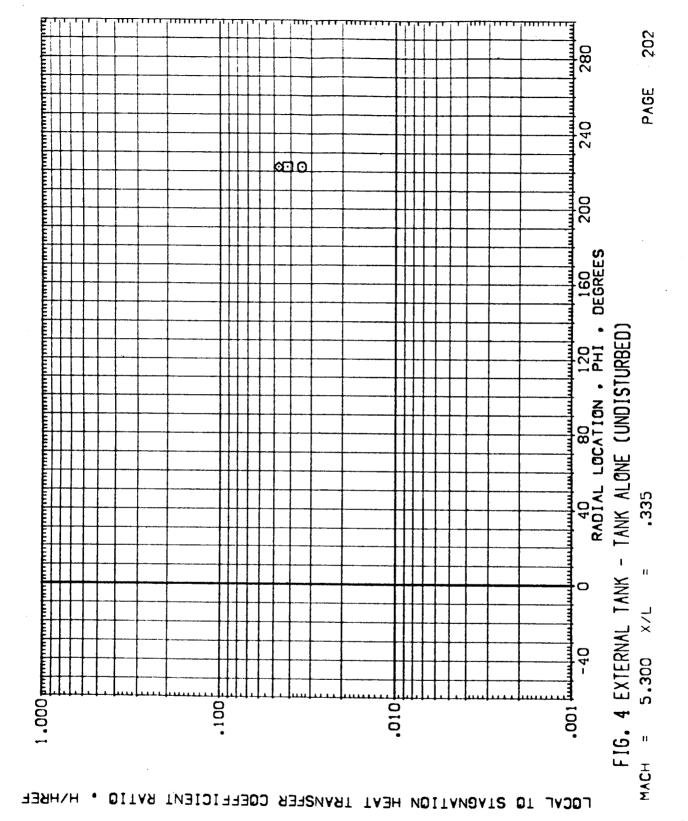




5.300 ×/L



₹ 2000 0000 0000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYMBO.
[RE1112]
[AE1112]
[BE1112]





200 160 DEGREES AD 80 120 RADIAL LOCATION . PHI . TANK ALONE (UNDISTURBED) <u>কা ত</u> .350 FIG. 4 EXTERNAL TANK -5,300 1.000 .100 010 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

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CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS)

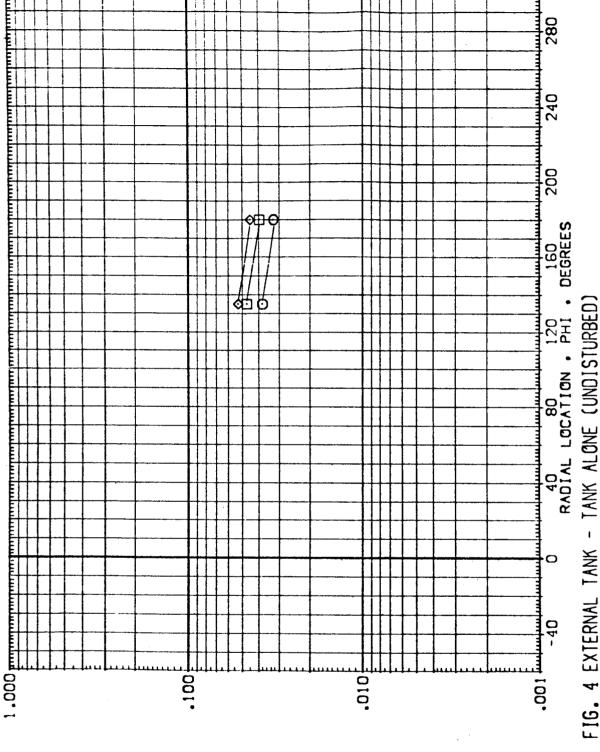
DATA SET SYNBOL

PAGE 203

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¥ - 8888 ₹ ∾∾∾ 9899 9898 # ₹ 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYNBOL.
[RE1112]
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURB)

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H = 5.300 ×/L = .400 Ó 0 -4 -4 100 .010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

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ET (TRIPS) CONFIGURATION D ARC 3.5-178 1H3 E ARC 3.5-178 1H3 E ARC 3.5-178 1H3 E

DATA SET SYNBOL

[RE1112]

[AE1112]

[BE1112]

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1.000 1.000 1.000 1.000 1.000 1.000 1.000 ₹ ოოო 2886 888 # 8888 888 Å 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) -010-DATA SET SYMBO.
[RE1112] (AE1112) (BE1112) 100

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160 DE**GREES** AO 80 120 RADIAL LOCATION . PHI . FIG. 4 EXTERNAL TANK - TANK ALONE (UNDISTURBED) ×// 5.300

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

₹ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYNBO.

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H/WH 90008









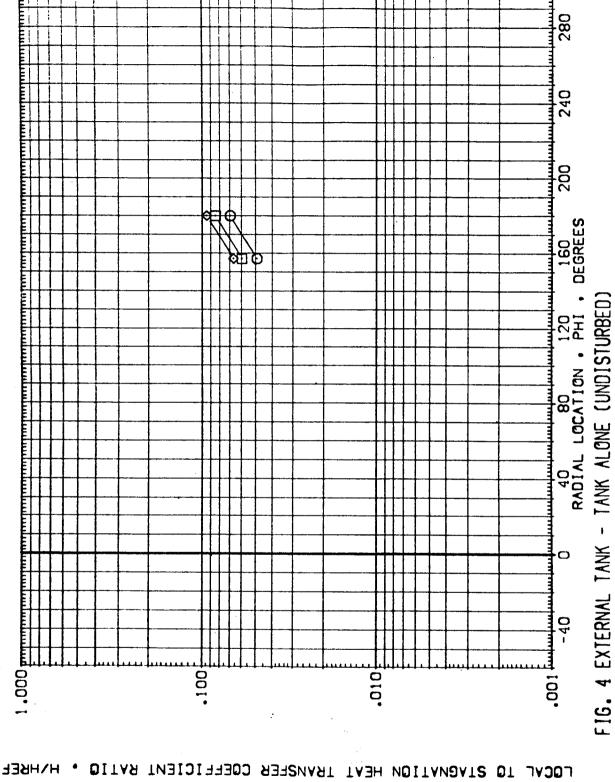


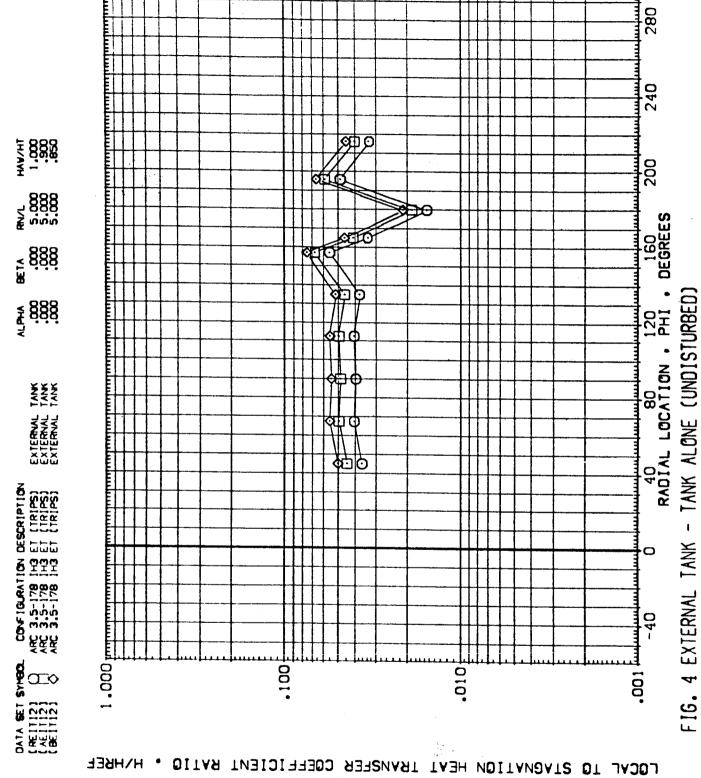


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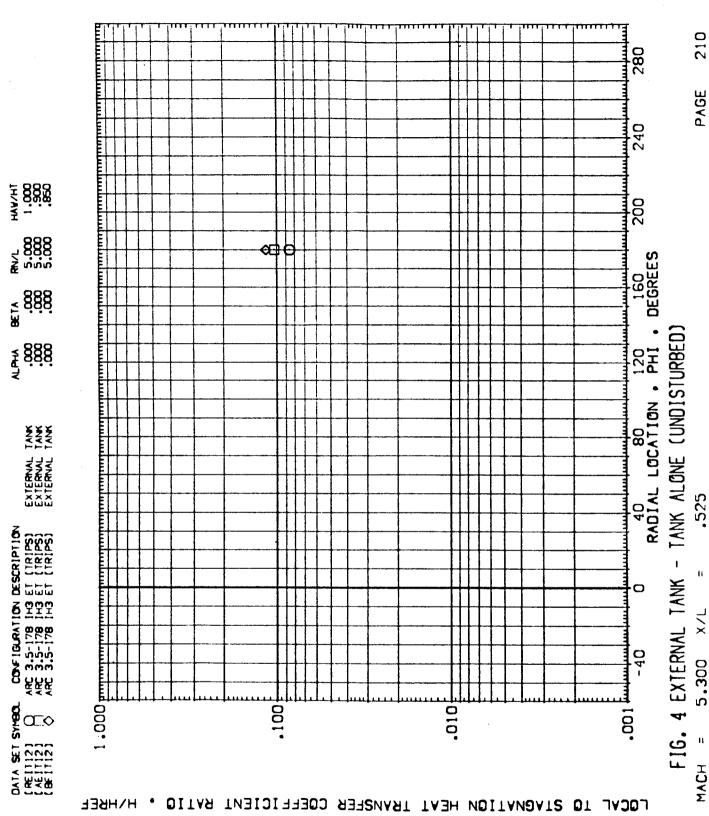
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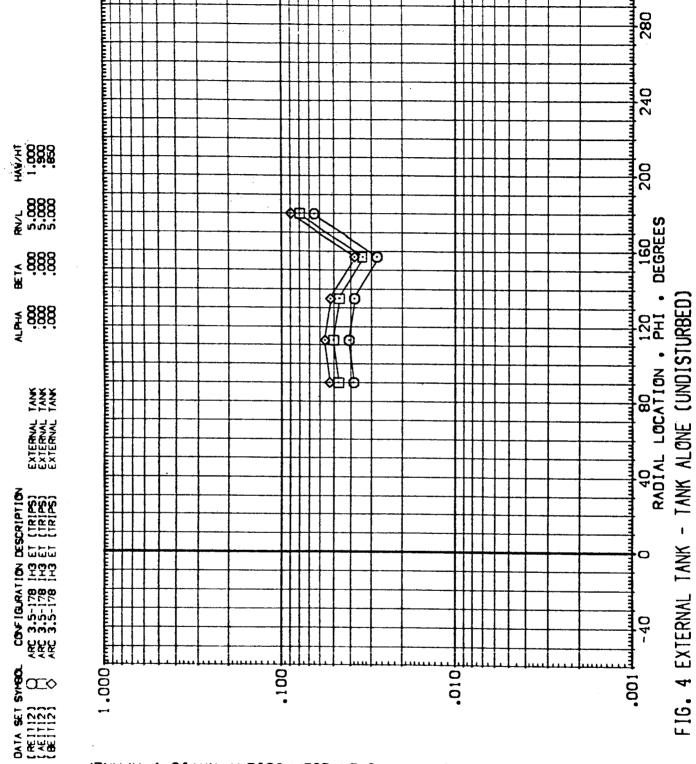




₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) **2** € DATA SET 9 [RE1112] [AE1112] [BE1112]

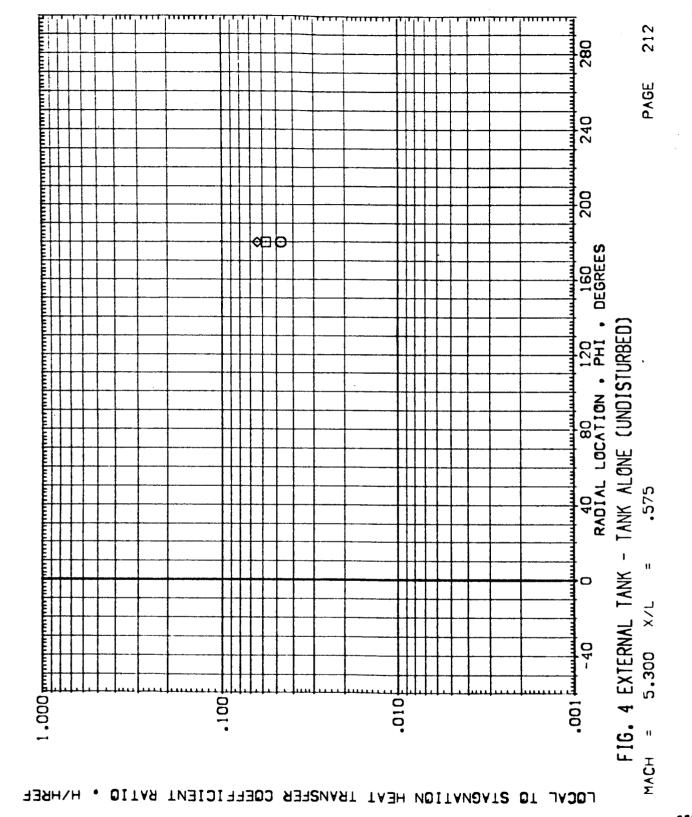






LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

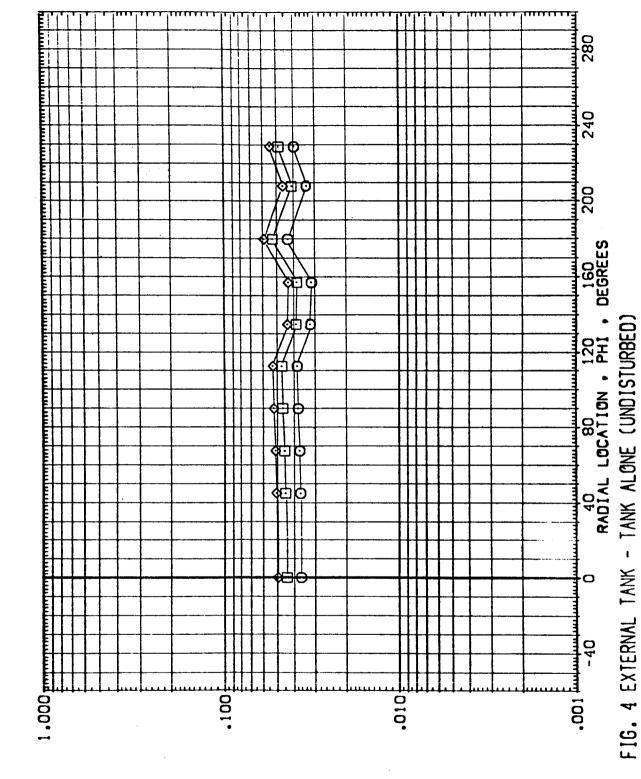
\$888 \$888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYMBO.
[RE1112] (AE1112) (AE1112)





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EXTERNAL 1 EXTERNAL 1 EXTERNAL 1

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS)

0ATA SET SYMBO.
[RE1112]
[AE1112]
[BE1112]

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRE

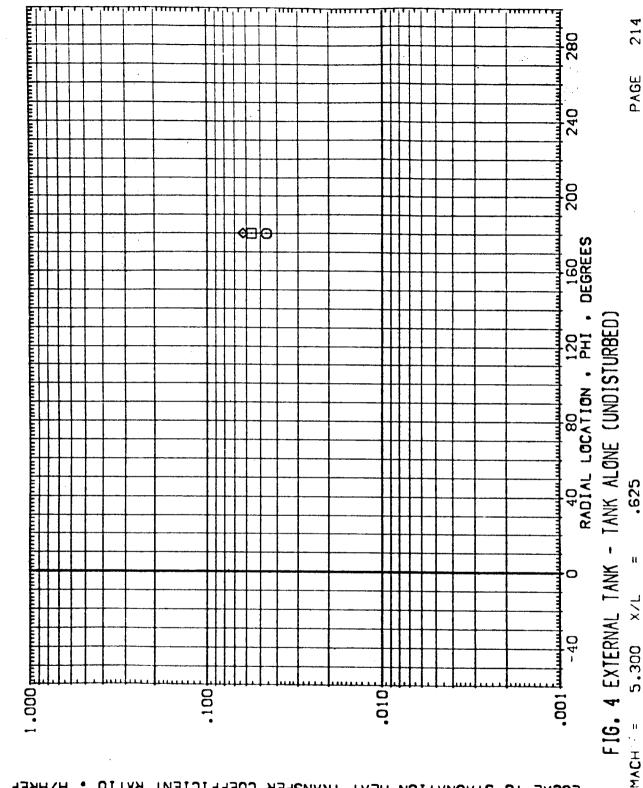
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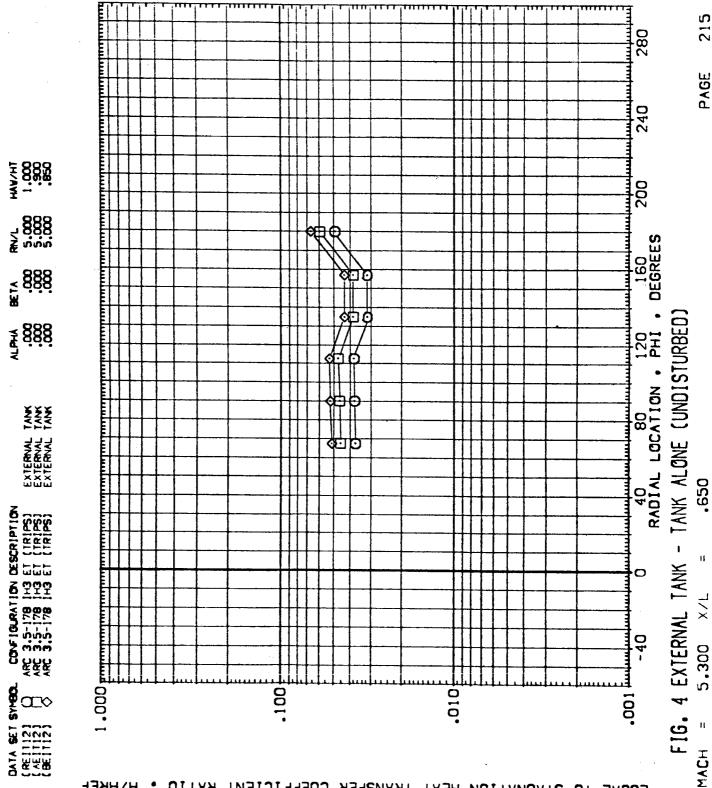


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



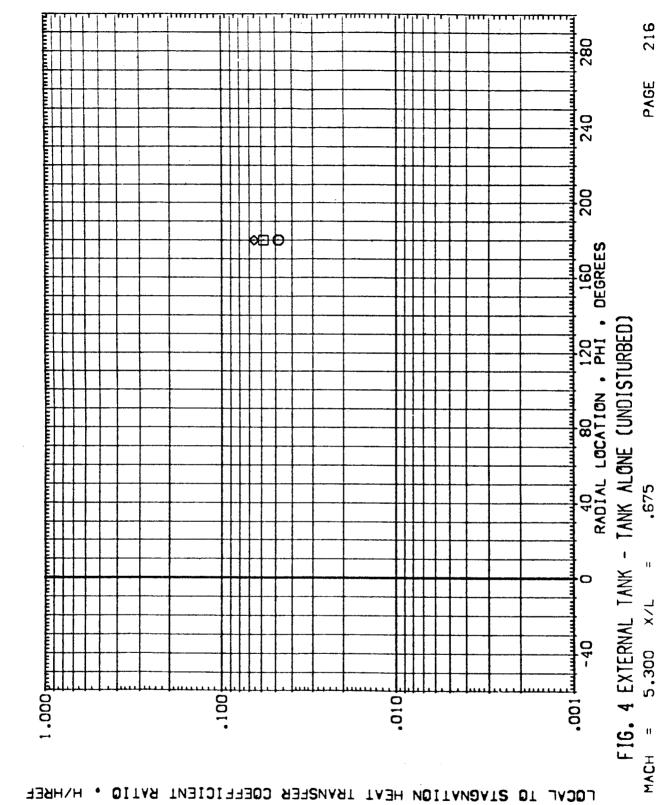
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF

888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ∞ DATA SET ((RE1112) (AE1112) (BE1112)





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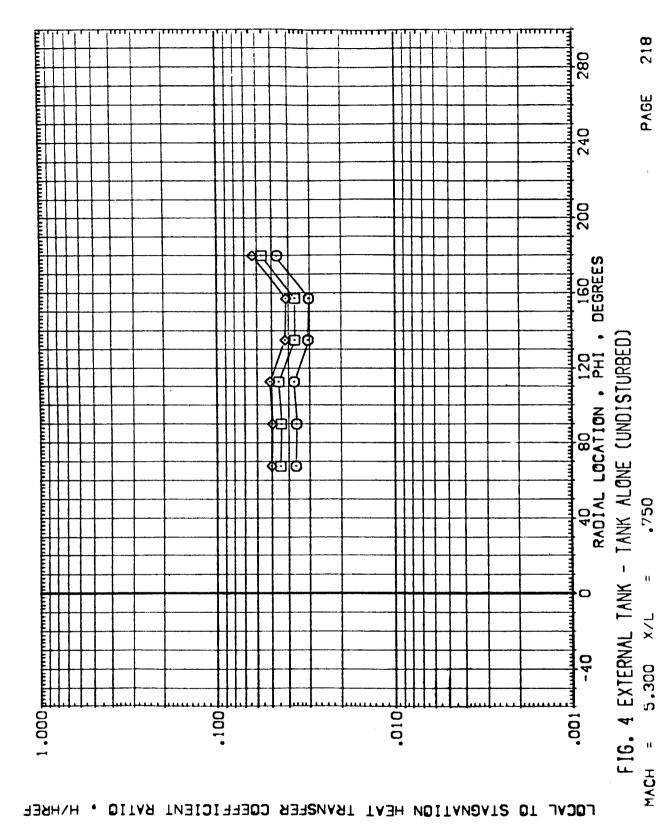
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DESCRIPTION ET (TRIPS) ET (TRIPS) ET (TRIPS)

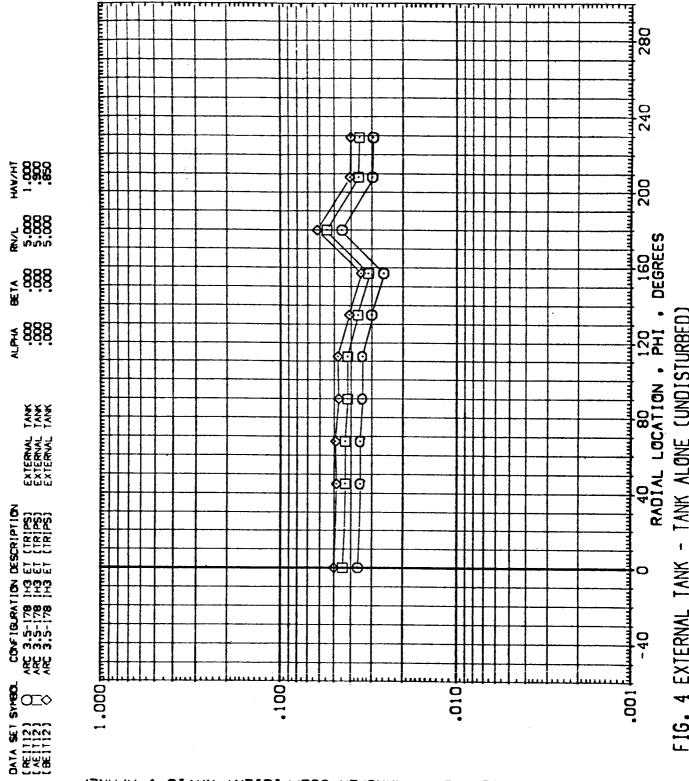
ARC 3.5-178 1H3 E ARC 3.5-178 1H3 E ARC 3.5-178 1H3 E

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1.000 1.000 8.000 8.000 ₹ ოოო 9000 9000 ₹ 868 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK COVE IGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYMBOL.
(ME1112)
(AE1112)
(BE1112)







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₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) DATA SET SYNBOL
(RE 1112)
(AE 1112)

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160 DEGREES

AD 80 120 RADIAL LOCATION . PHI .

TANK ALONE (UNDISTURBED)

FIG. 4 EXTERNAL TANK -

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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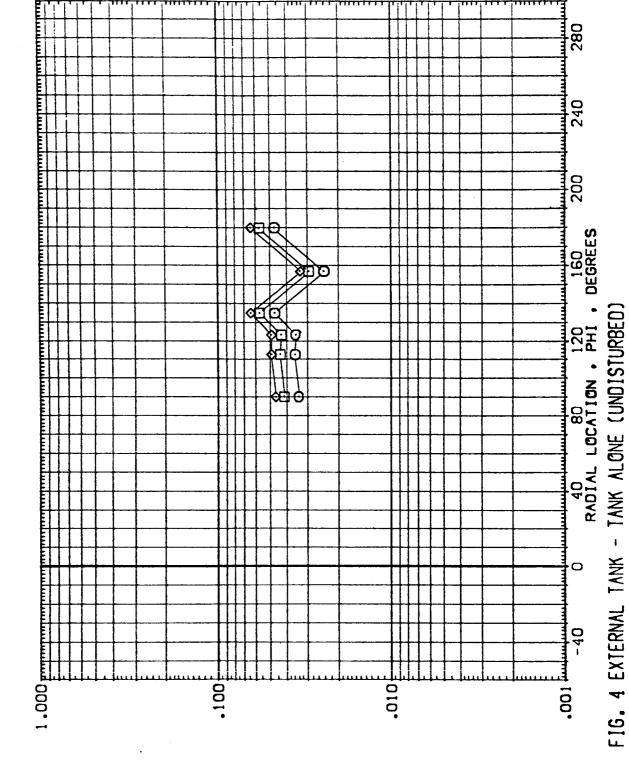
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> EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

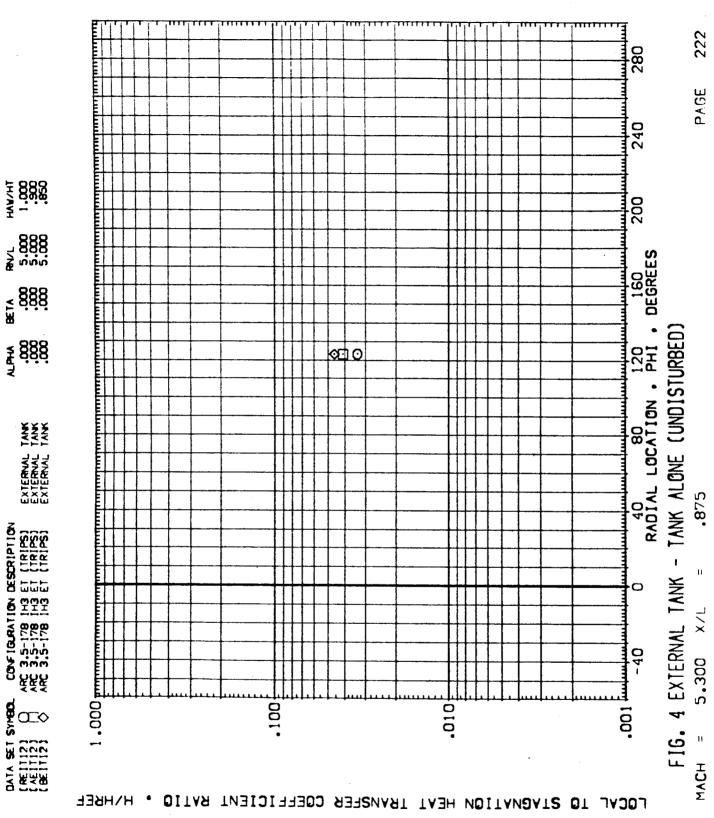
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DATA SET SYMBOL (PE1112) (AE1112) (BE1112)

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

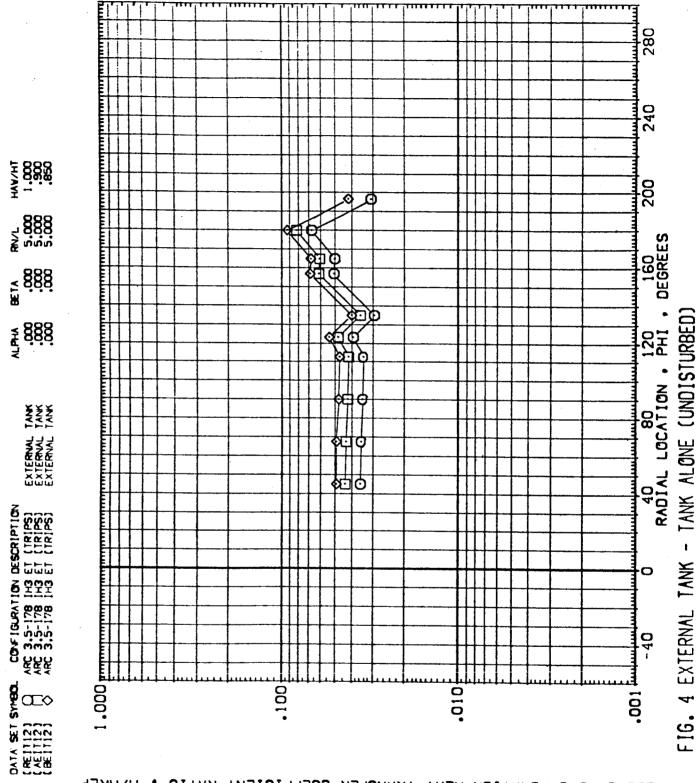
₹ 888 988 ₹ 888 888 £ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) DATA SET SYMBD.

(ME1112)
(AE1112)
(BE1112)





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

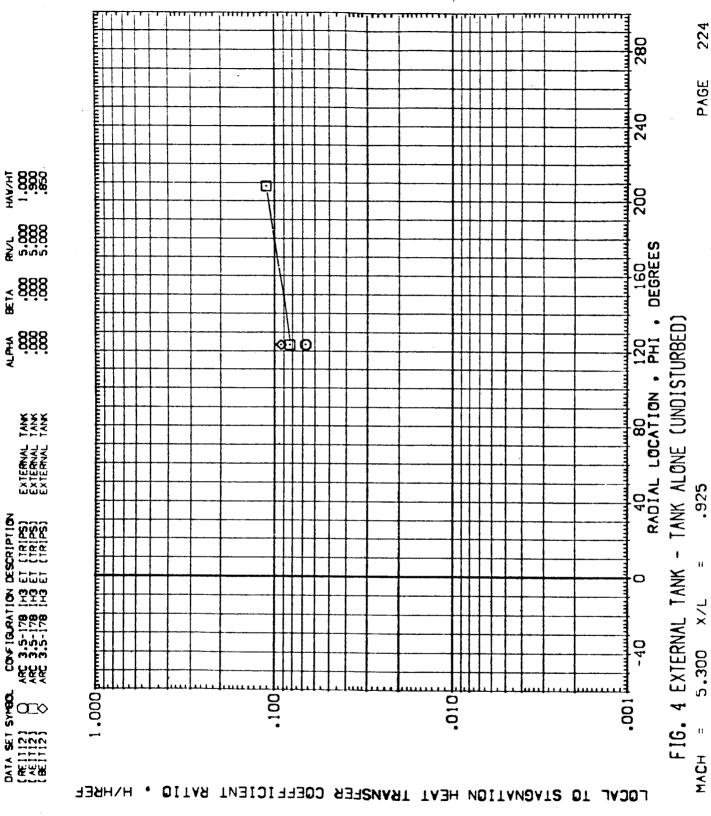


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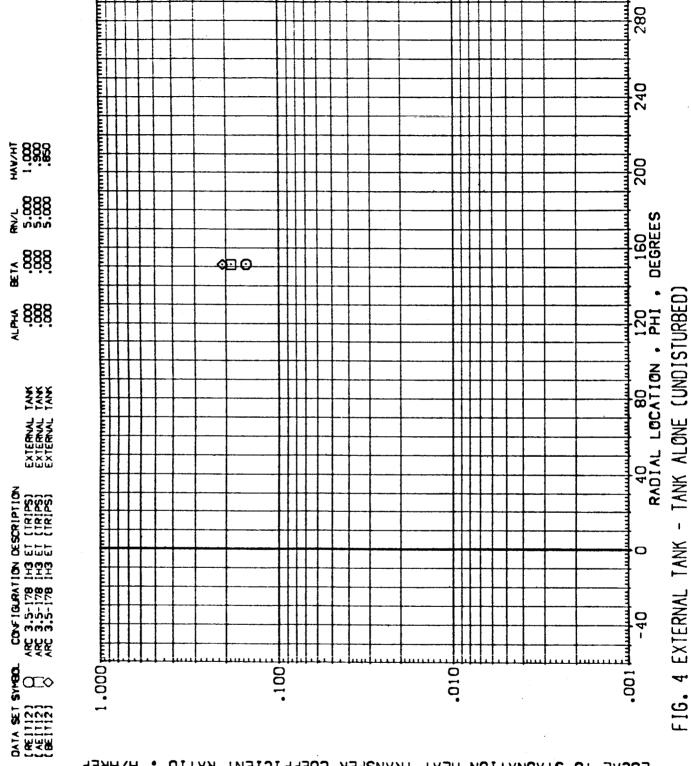
₹ ოოო 9000 9000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS) ARC 3.5-178 H3 ET (TRIPS)





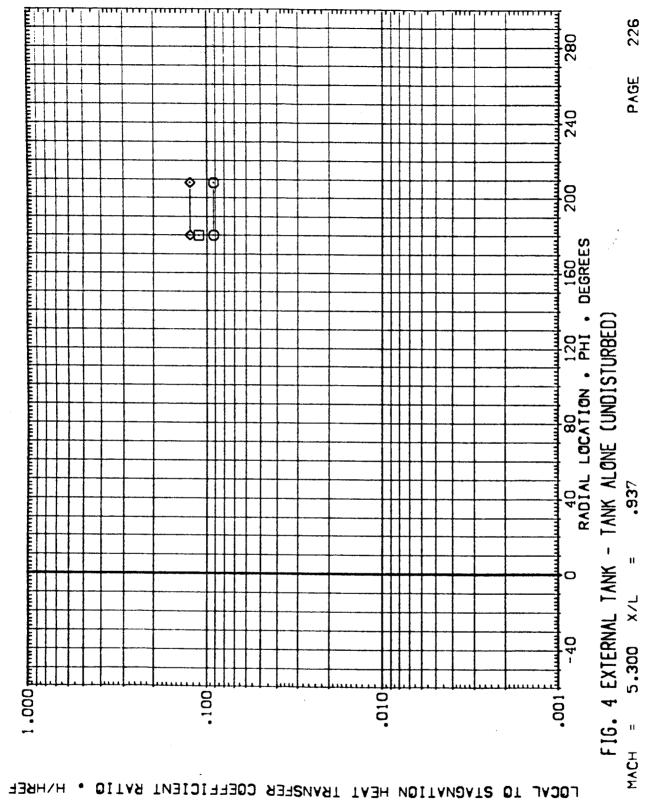
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TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF רפכער

¥ 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.0 ₹ 986. 800. 800. ¥ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) ARC 3.5-178 IH3 ET (TRIPS) **§** c=> DATA SET ((RE1112) (AE1112) (BE1112)

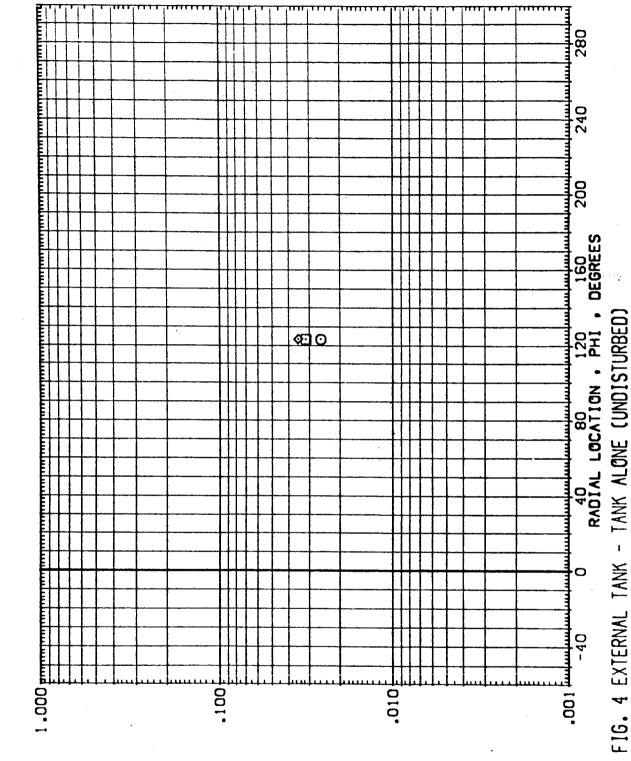




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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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> EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

ET (TRIPS) ET (TRIPS) ET (TRIPS) ET (TRIPS)

ARC 3.5-178 H3 EARC 3.5-178 H3

DATA SET SYMBO.
[RE1112] (AE1112) (AE1112) (AE1112)

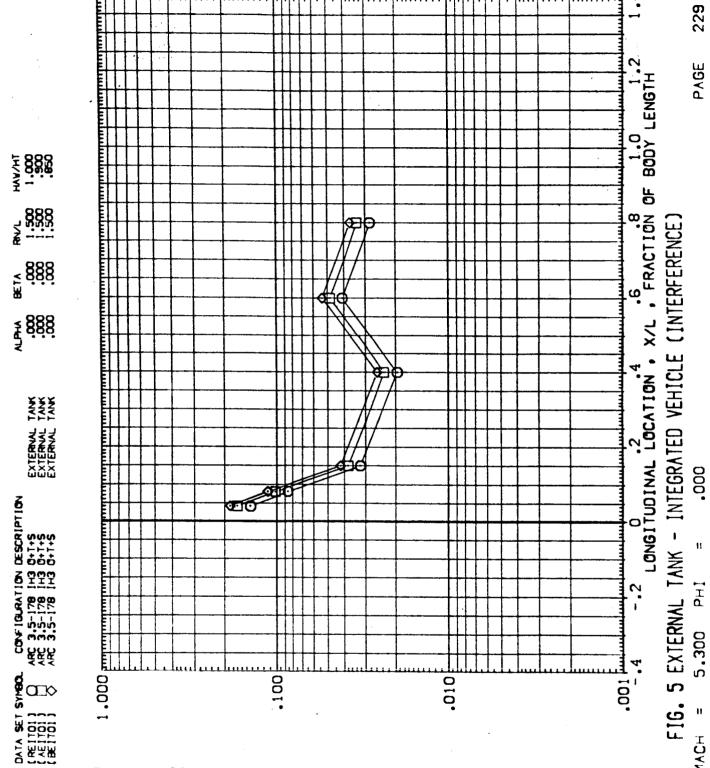


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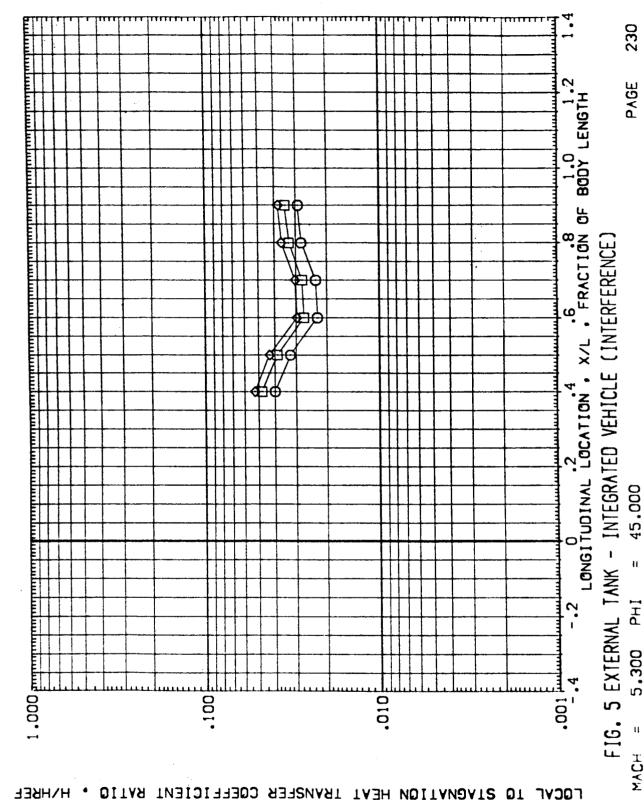


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . H/HREF

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 DATA SET SYMBO.

¥ -000.9 000.9 000.9

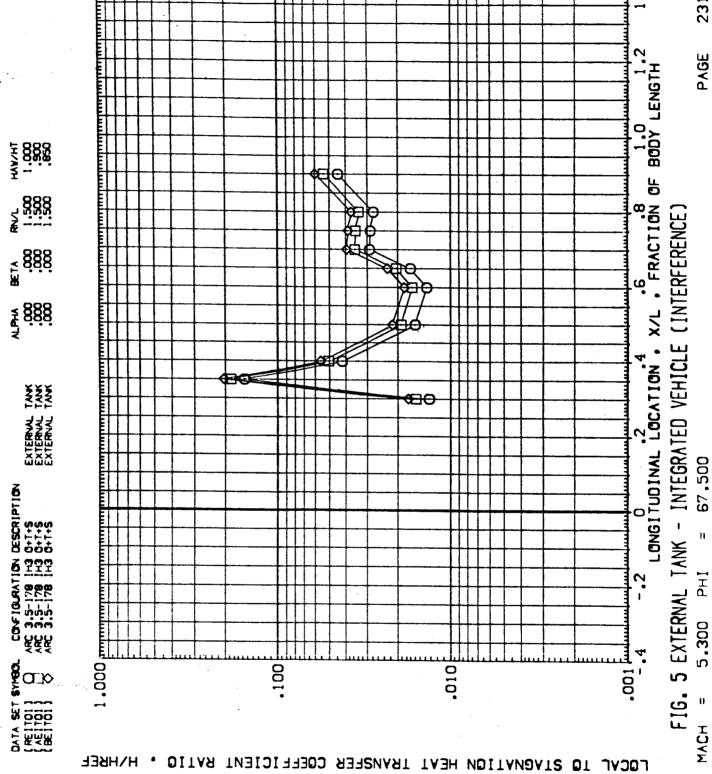
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LONGITUDINAL LOCATION , X/L , FRACTION OF BODY LENGTH FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) .001 010

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



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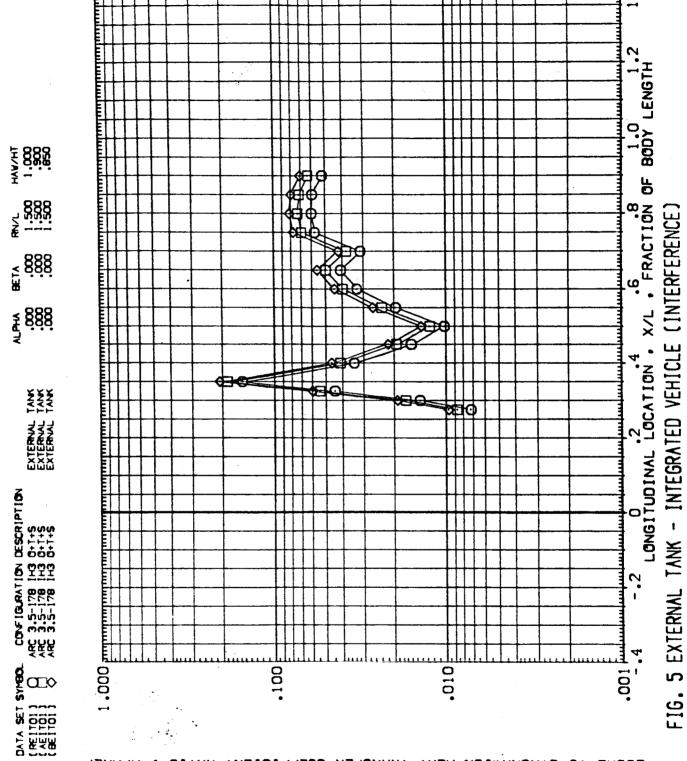
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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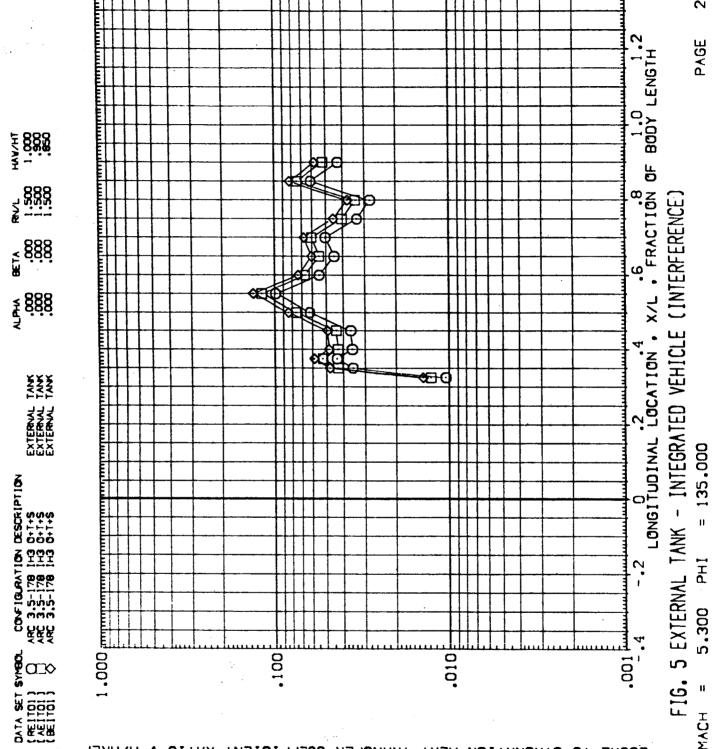
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CONGITUDINAL LOCATION , X/L , FRACTION OF BODY LENGTH octor all FIG. S EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) .100 010 .001

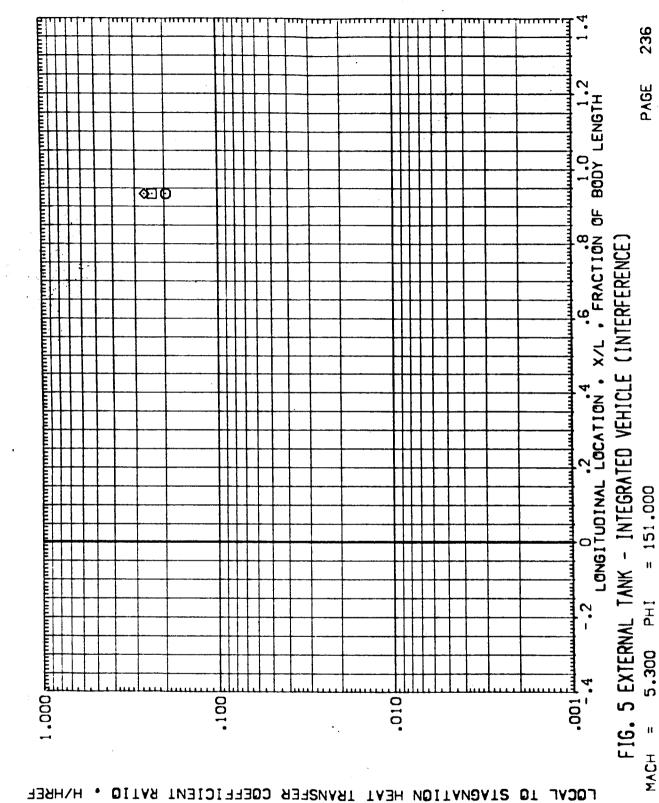
IQ SIVONVIIQN HEVI IBYNZEER COEFFICIENI BAIIQ . HVHREF

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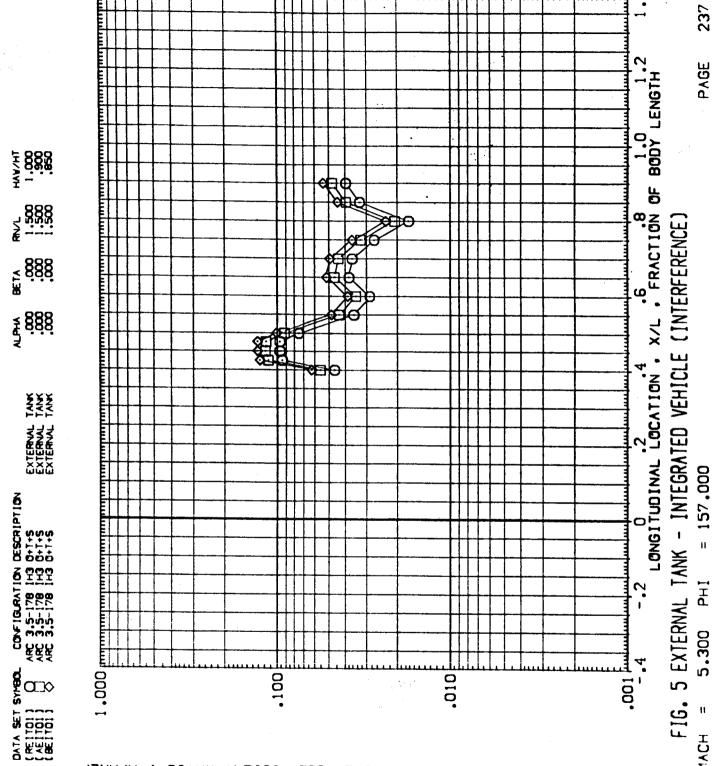
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 0ATA SET SYNBO. (RELTOL) (AELTOL) (BELTOL)

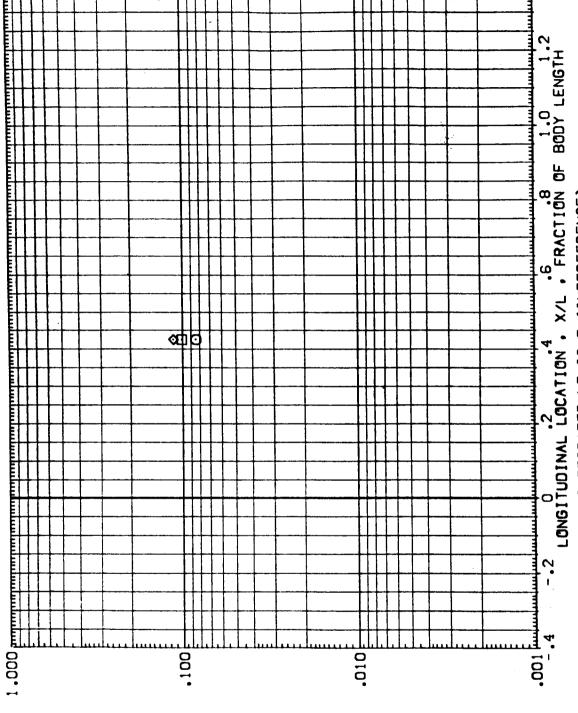




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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . H/HREF



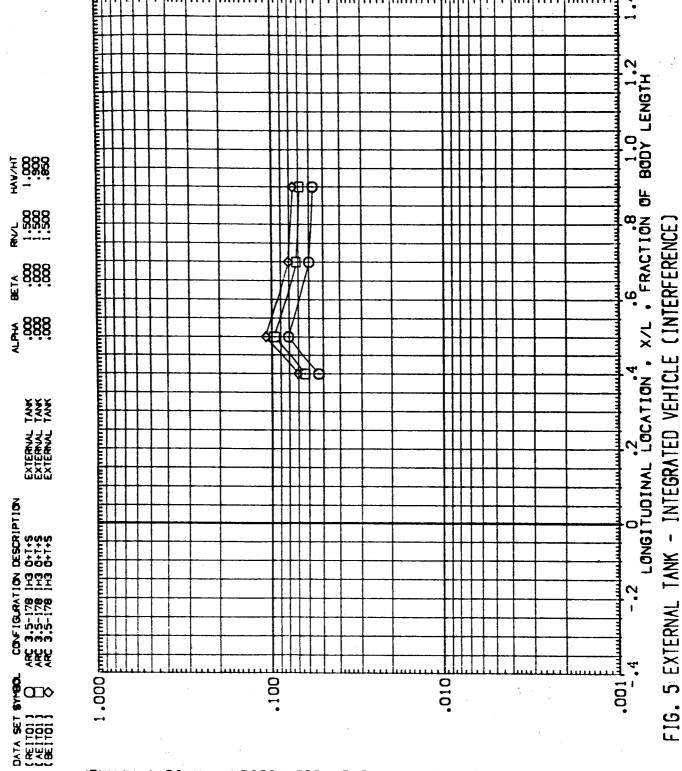
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) MACH

= 165.000

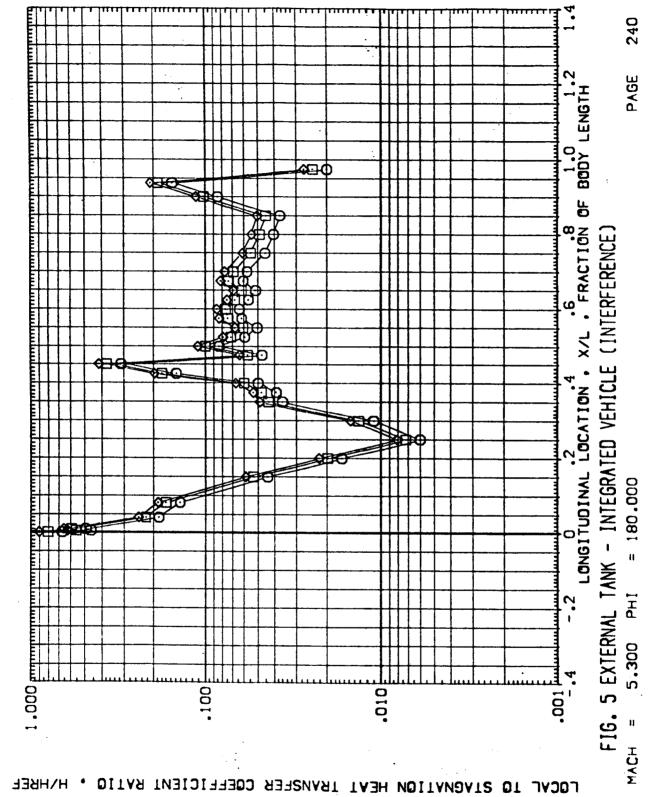
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

₹ -888 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ∞ DATA SET (RE1701) (AE1701) (BE1701)





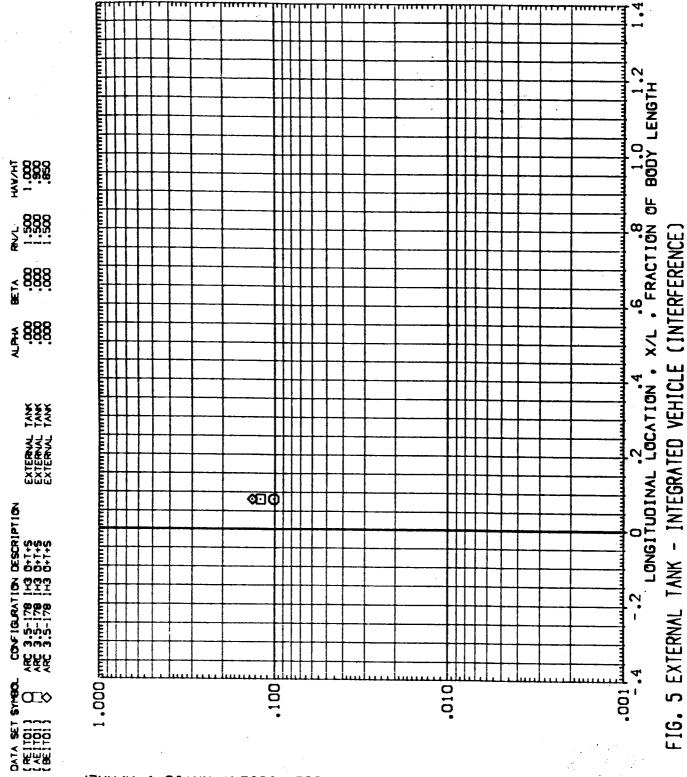
= 194,000

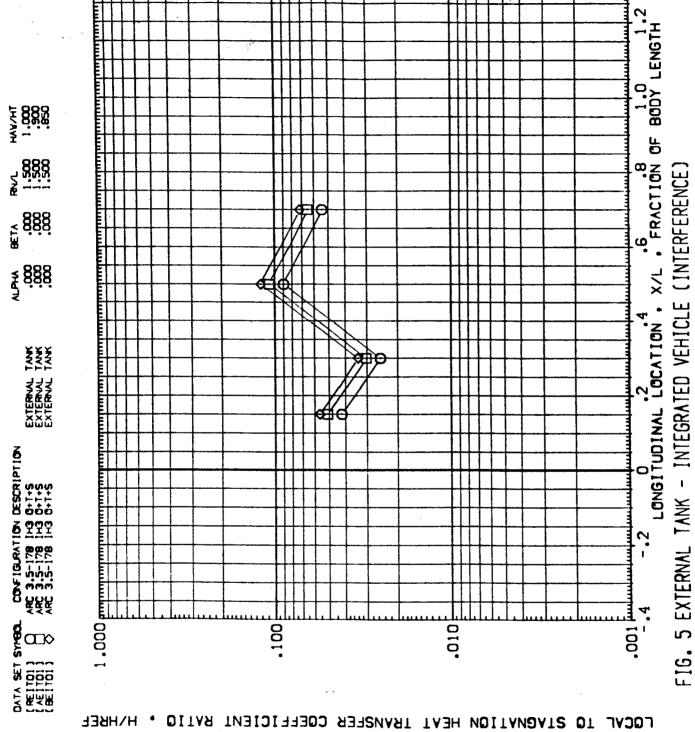
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5,300 MACH

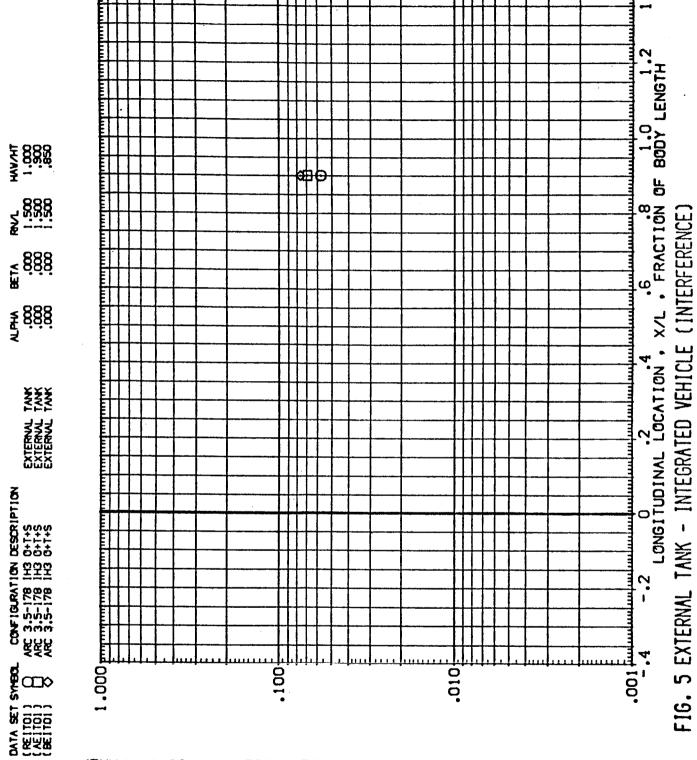
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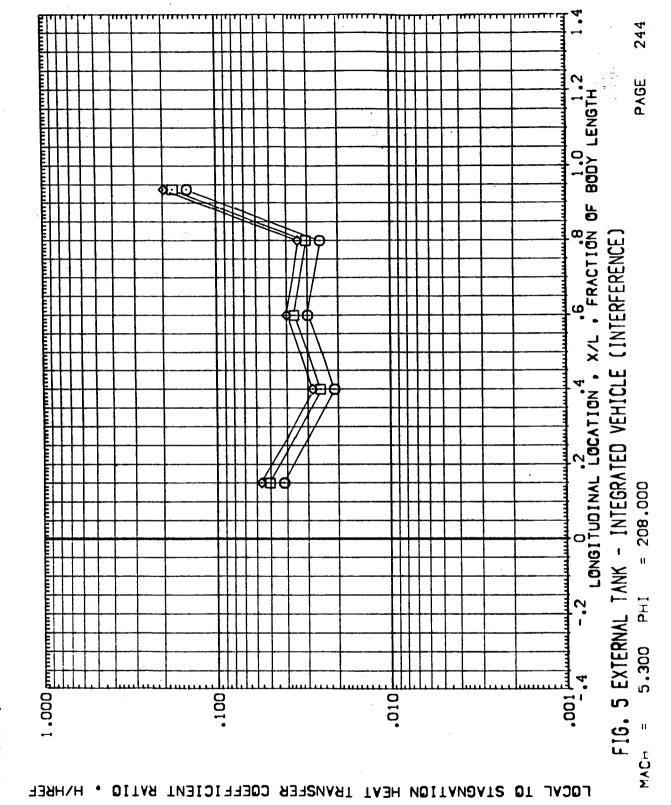
= 197,000

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

| DATA SET SYMBOL COMFIGURATION DESCRIPTION | EXTERNAL TANK | .000 .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000





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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

FIG. S EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) = 222,500 E E 5,300 MACH

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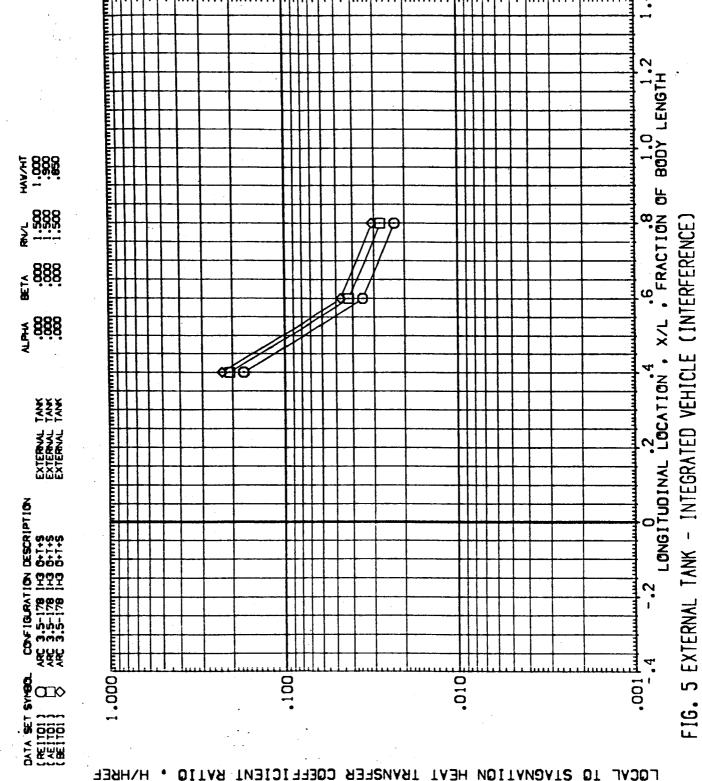
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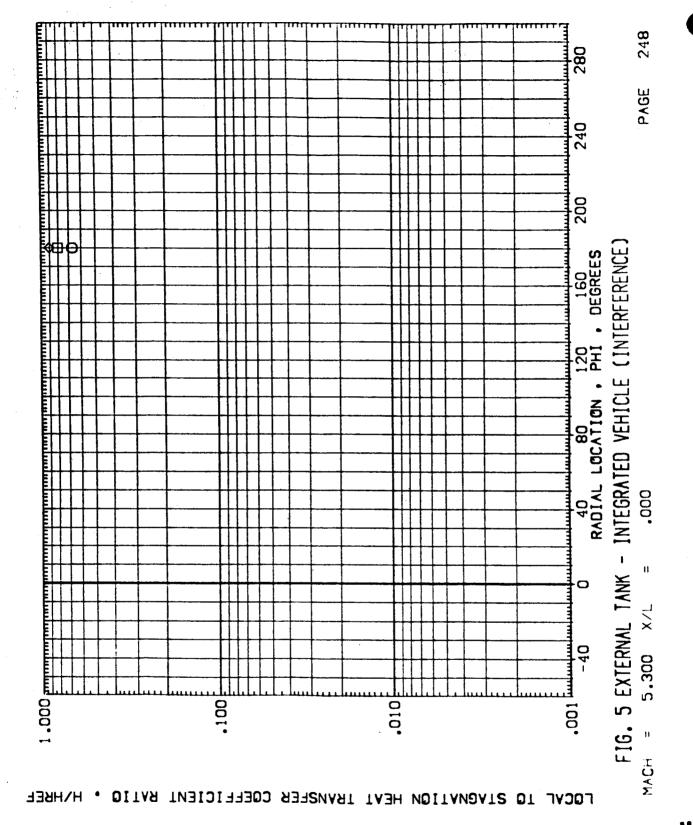
= 229,000

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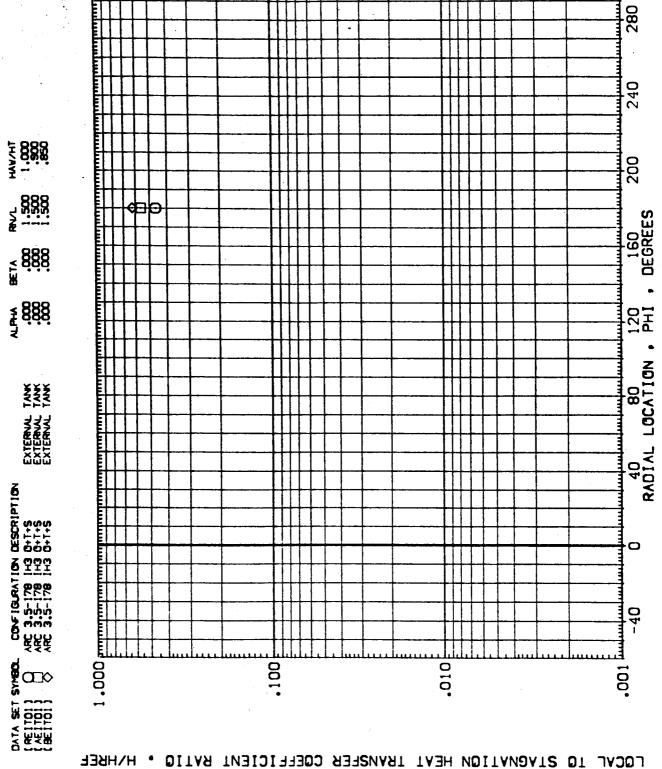
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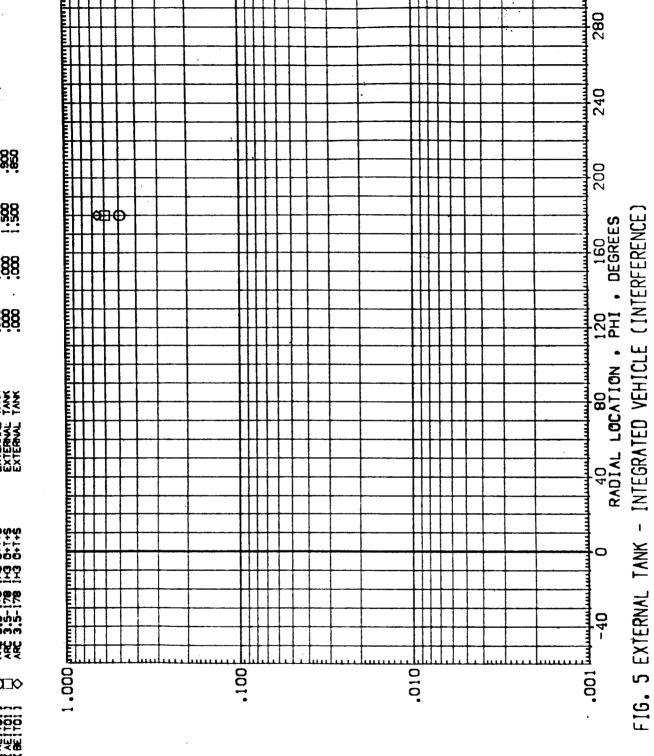
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

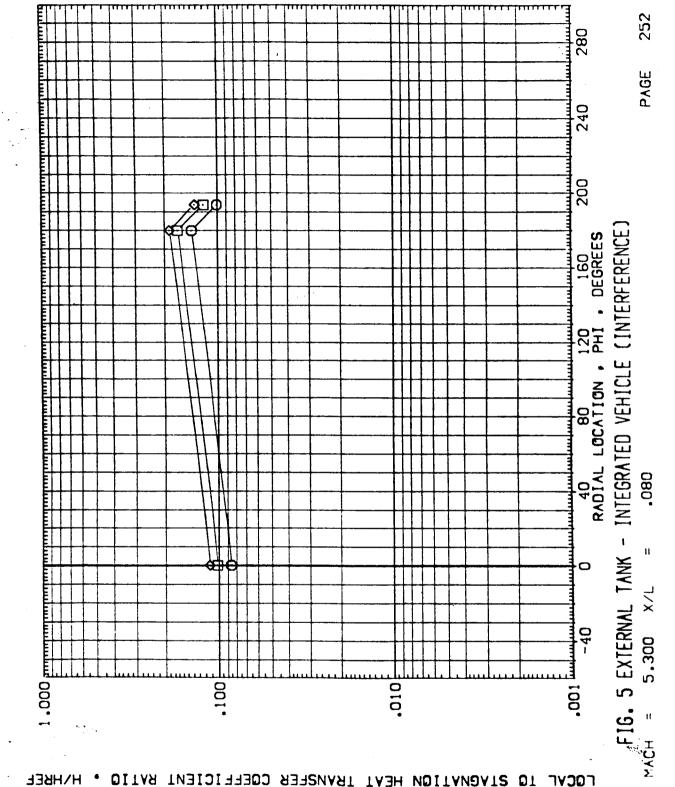


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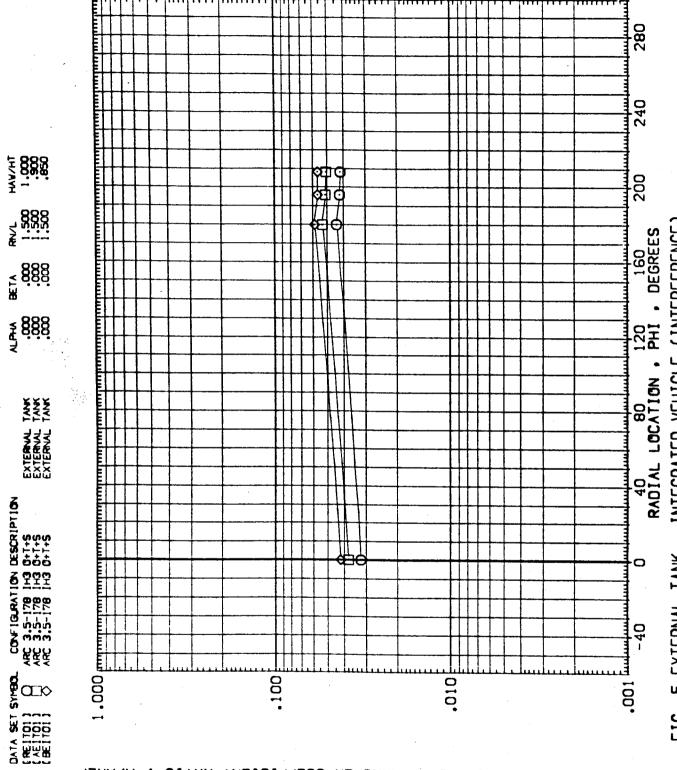
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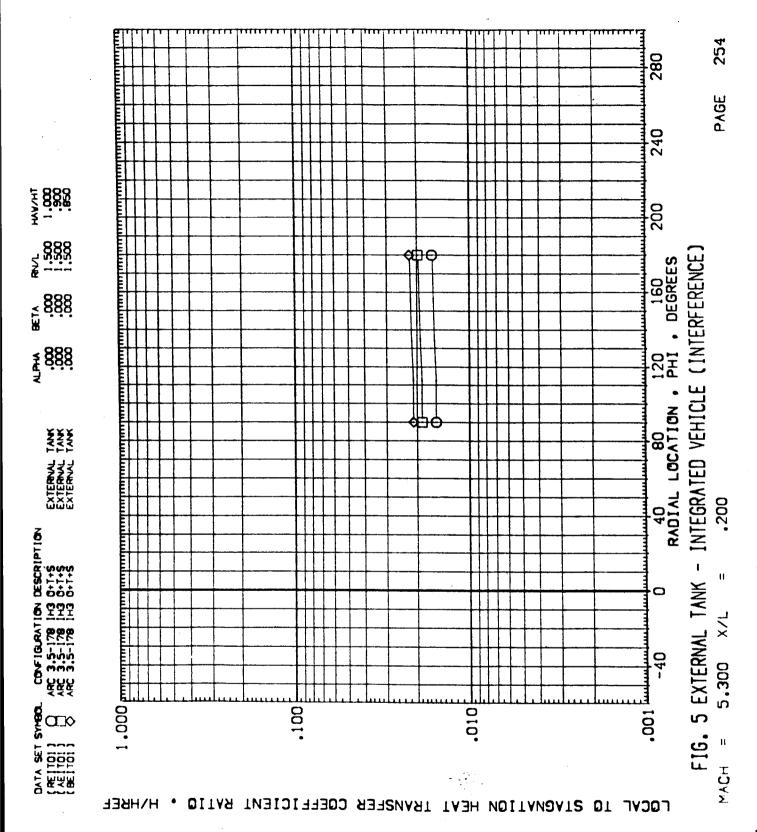
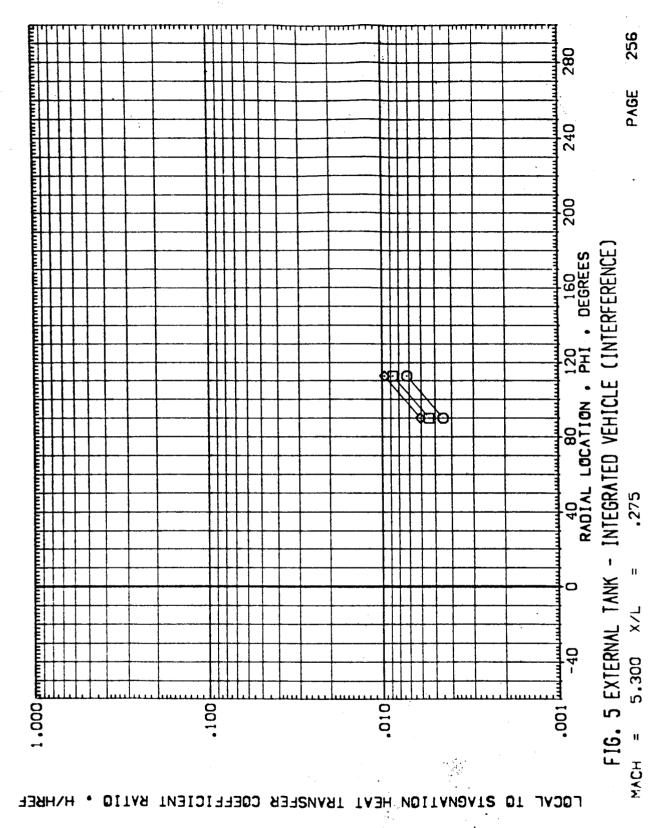


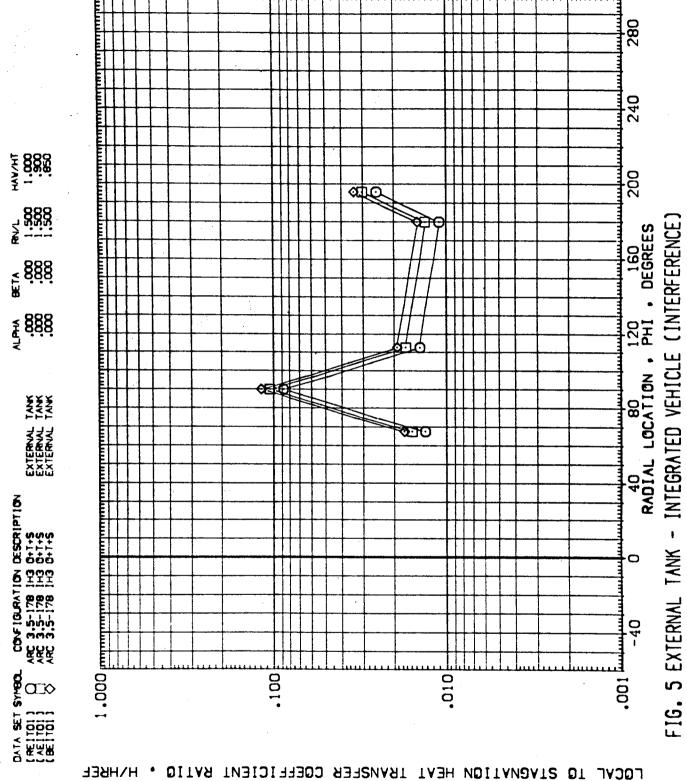


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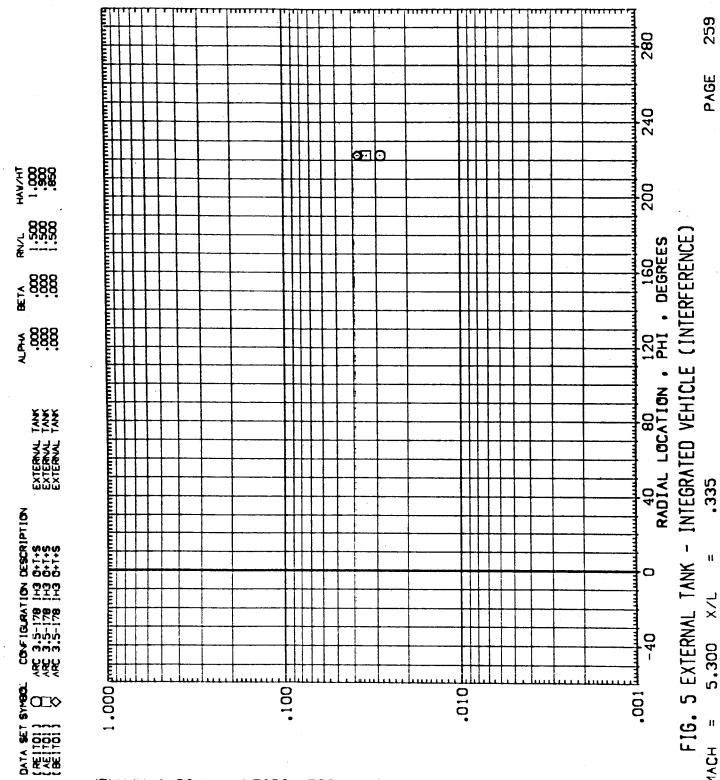






258 280 PAGE 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE: 40 80 120 160 RADIAL LOCATION , PHI , DEGREES ,325 XX 5,300 .00 MACE LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

280 ¥ -8888 1 8888 200 160 • DEGREES ₹ 888 888 ¥ 888 40 80 120 RADIAL LOCATION . PHI EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK **10** 1.000 բողուդուդուդուդուդուդուդուդու CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 .100 010 **§** co⇒

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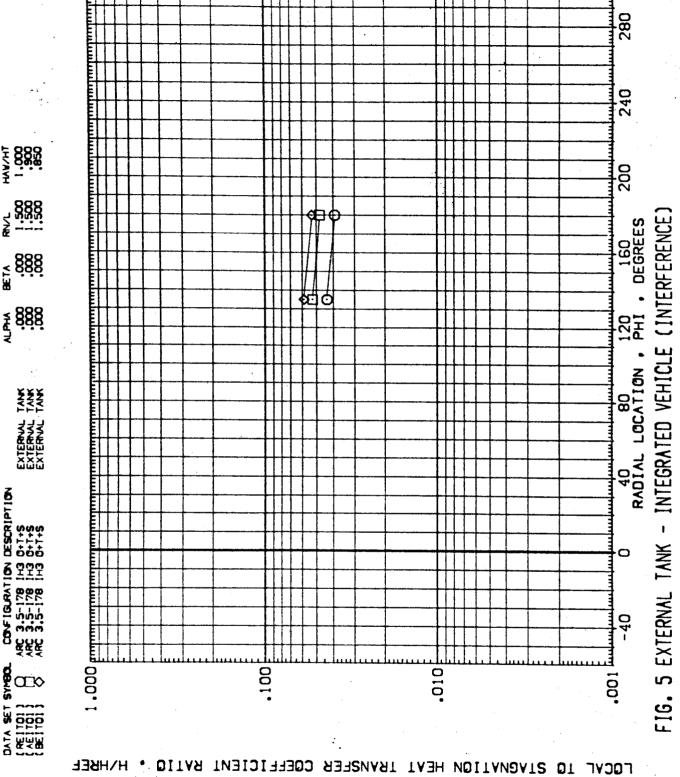
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INTEGRATED VEHICLE (INTERFERENCE)

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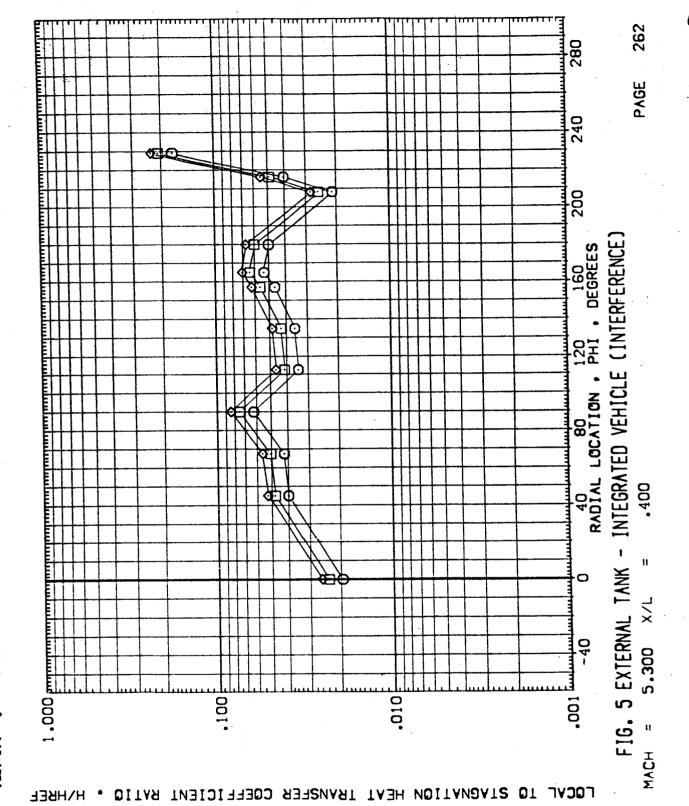
FIG. 5 EXTERNAL TANK





₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5

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OCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER



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INTEGRATED VEHICLE (INTERFERENCE)

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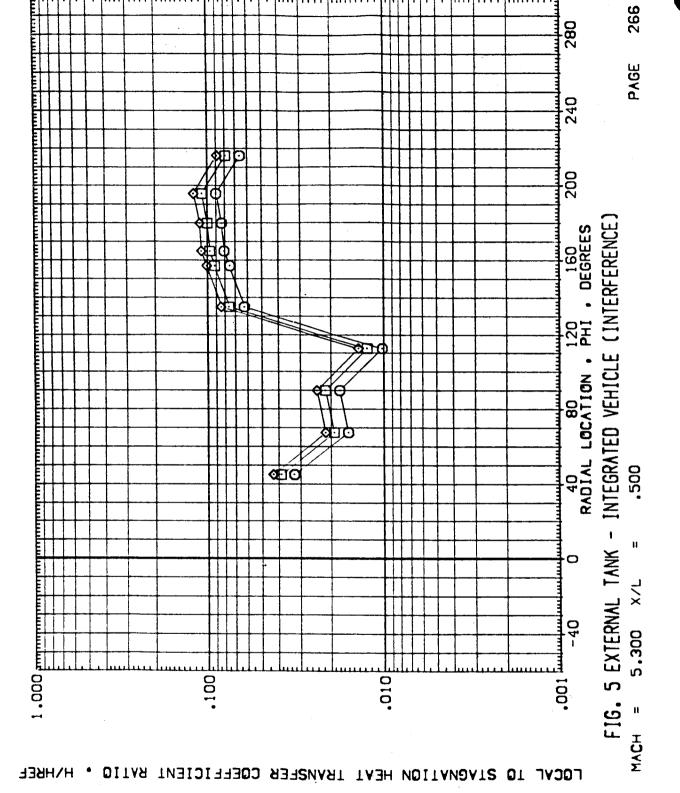
FIG. 5 EXTERNAL TANK -

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40 80 120 160 RADIAL LOCATION , PHI , DEGREES

¥ -8999 1 8000 # 888 \$88 ₹ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IM3 0+1+5 ARC 3.5-178 IM3 0+1+5 ARC 3.5-178 IM3 0+1+5 ğ ar DATA SET (RE 1701) (RE 1701) (RE 1701)

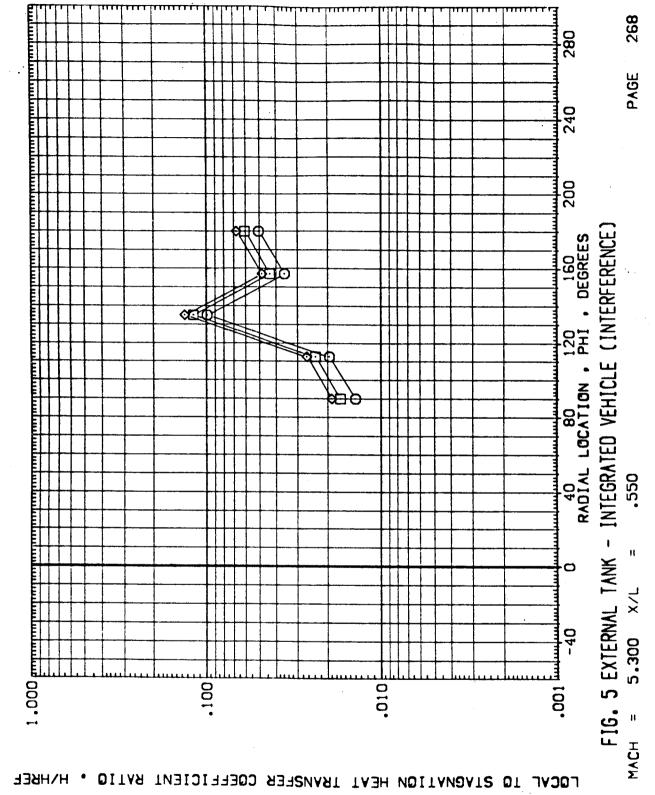




267 280 PAGE 240 H/W/H7 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) A0 80 120 160 RADIAL LOCATION , PHI , DEGREES ¥ 888 .525 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+T+S ARC 3.5-178 IH3 0+T+S ARC 3.5-178 IH3 0+T+S 0 5.300 x/L -40 .001 14 **§** C□> .100 .010 DATA SET 6 (RE1701) (AE1701) (BE1701) MACH 10 SIVENVIION HEVI IBVNSEER COEFFICIENT RATIO . HARREF

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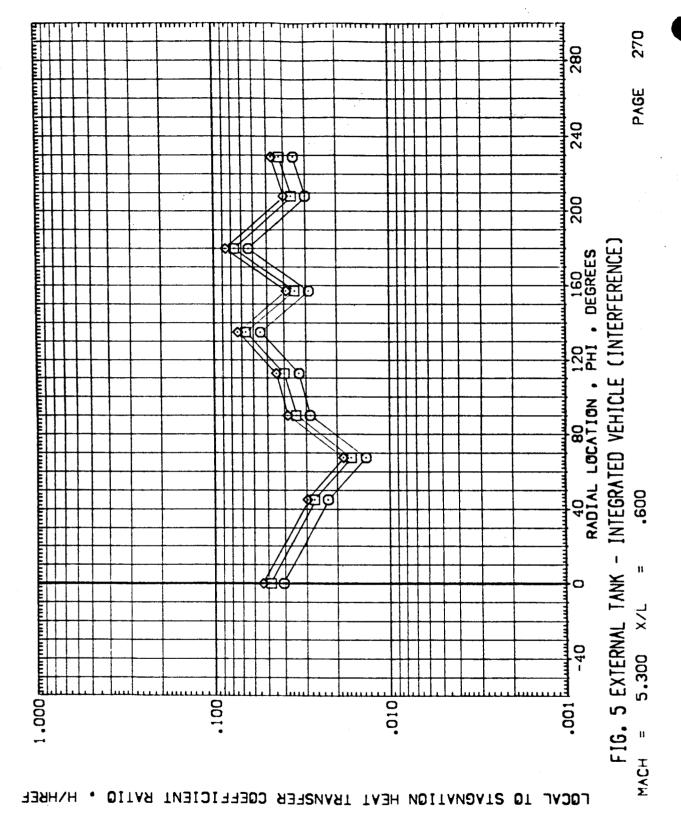


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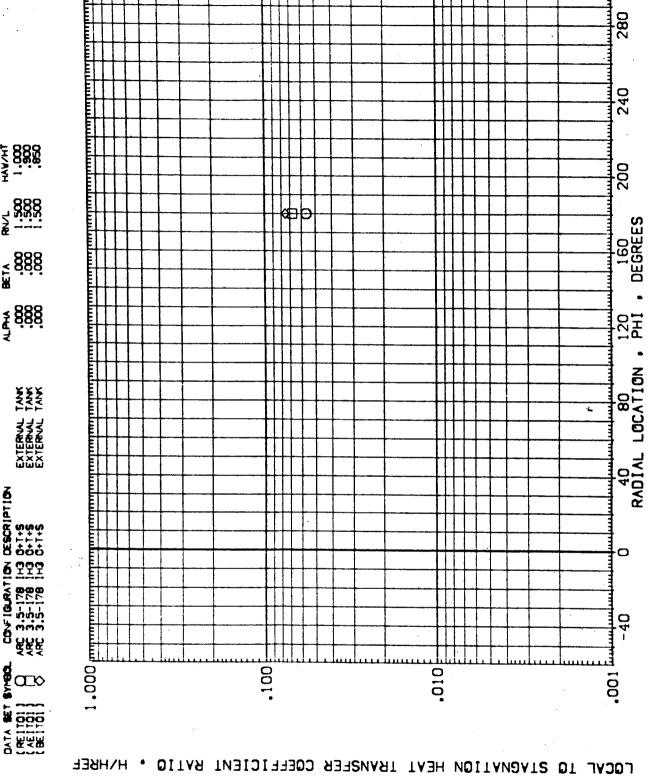
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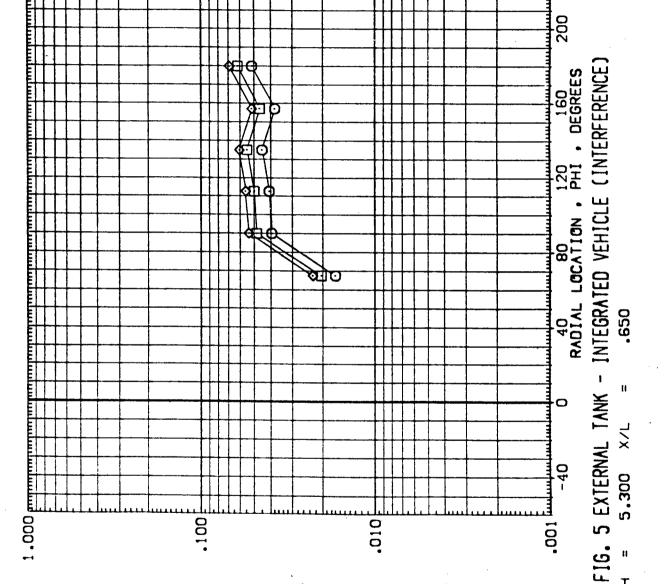






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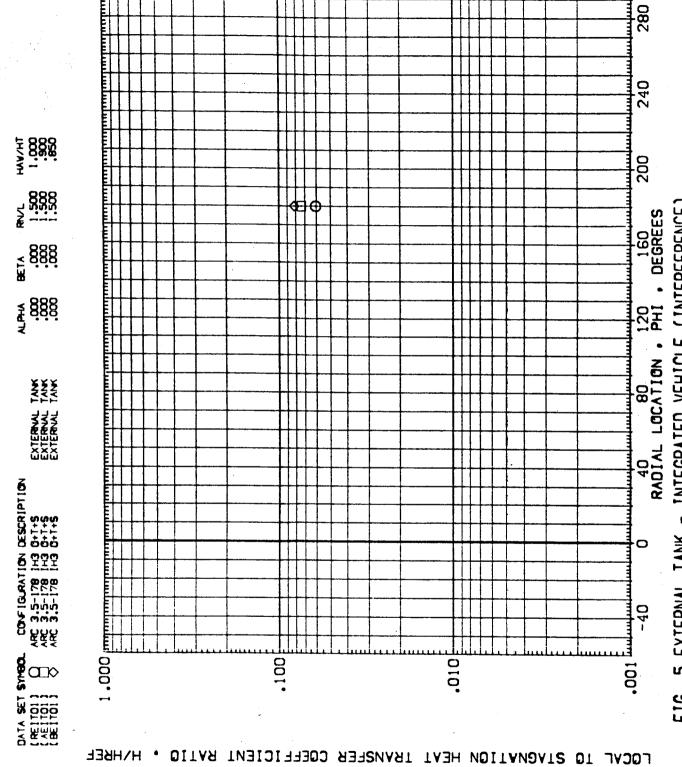
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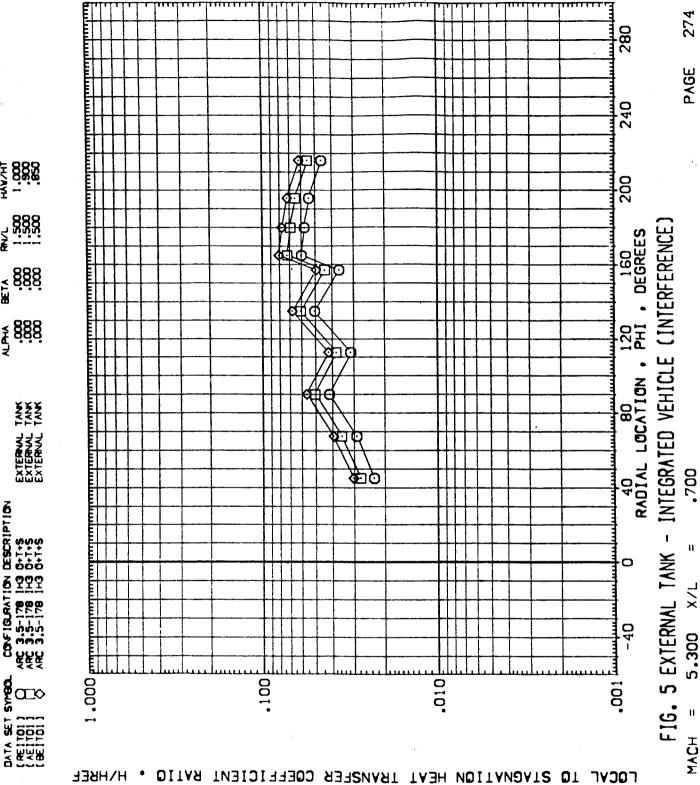


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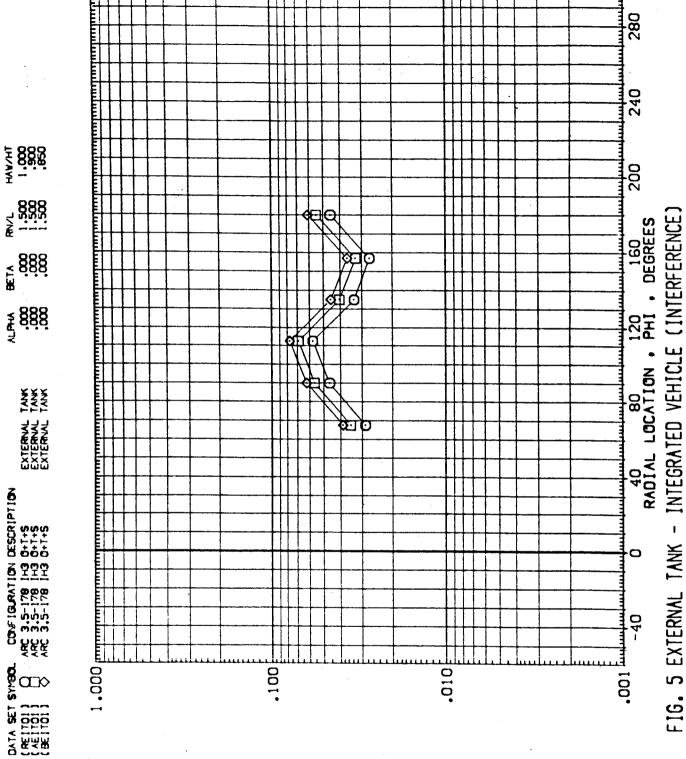






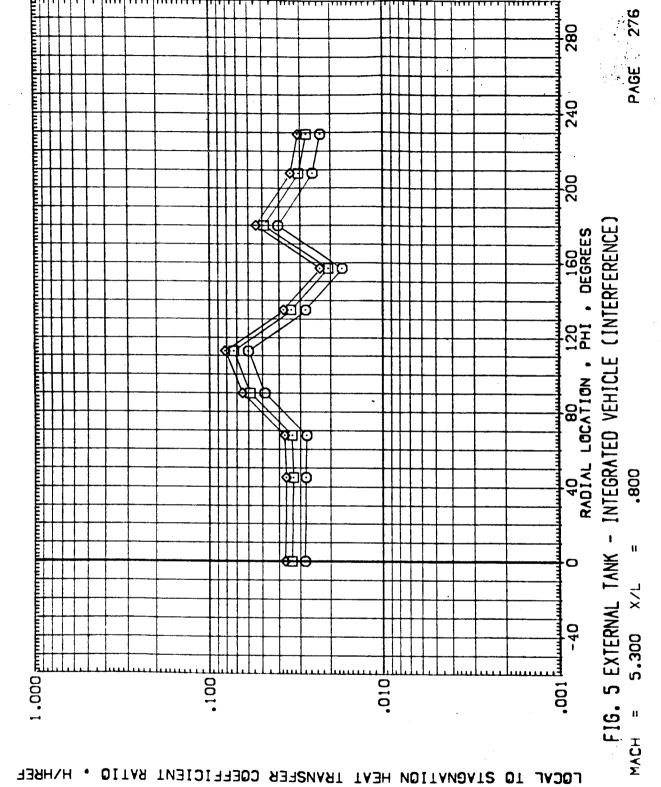
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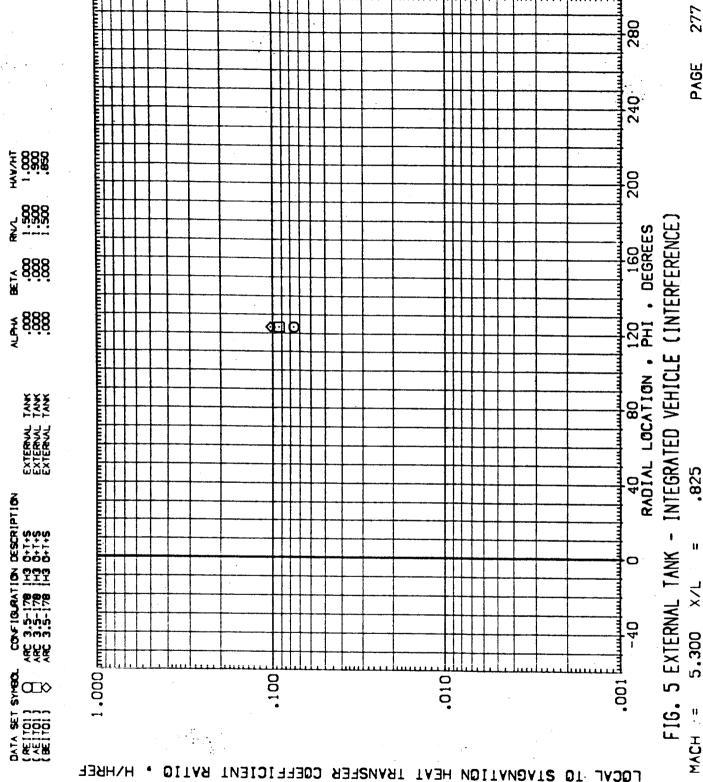


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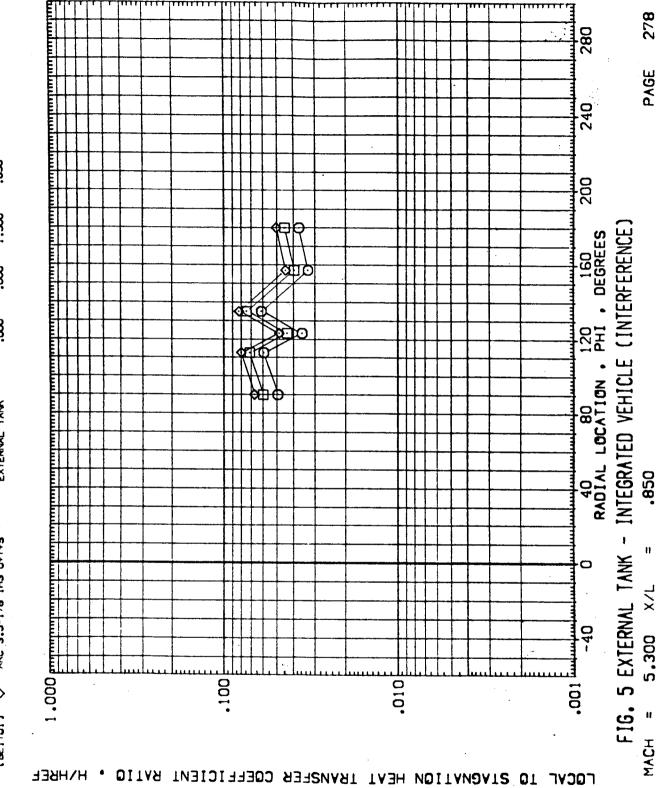






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FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

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H/YH - 60000 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5

280 200 - INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES Q EQ FIG. 5 EXTERNAL TANK 0 .100 010 .001 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



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281 280 PAGE 1.000 1.000 9.000 9.000 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION . PHI . DEGREES # 888 888 ₹ 888 മാമ EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ∯a⊃> .100 .010 DATA SET (RE1701) (BE1701) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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AD 80 120 160 RADIAL LOCATION , PHI , DEGREES .935 FIG. 5 EXTERNAL TANK -1 .000 բոպուպուպուպուդ 5,300 100 .010 .00 RACH TACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

INTEGRATED VEHICLE (INTERFERENCE)

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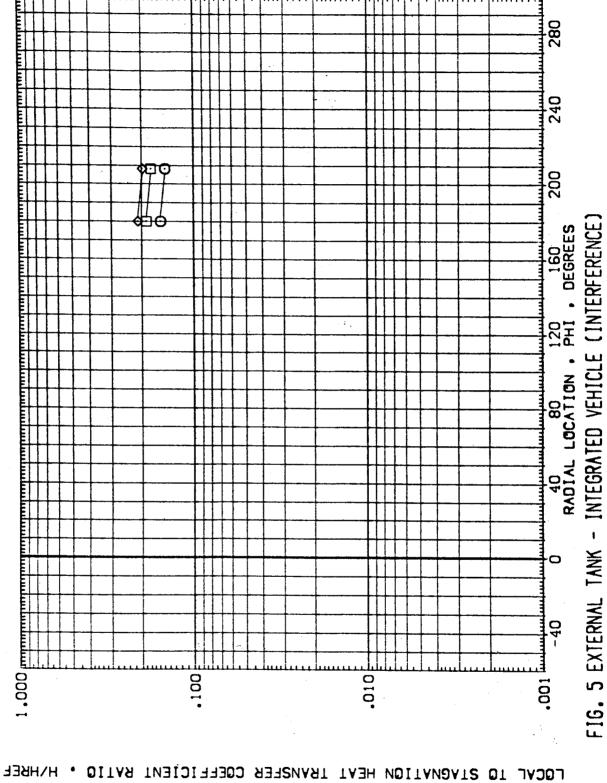
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113 0+1+5 ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | DATA RET A REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S REITOD S R

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

280 200 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION , PHI , DEGREES **a b** FIG. 5 EXTERNAL TANK -1.000 programmy may may may may may may may a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon .100 010

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



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285 280 PAGE 200 ⋘ INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION , PHI , DEGREES # 5000 5000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .975 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 FIG. 5 EXTERNAL TANK -1 .000 բողուդուդուդուդուդ -40 5,300 .001 134 PATA SET SYNBOL (**E17013) 100 .010 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



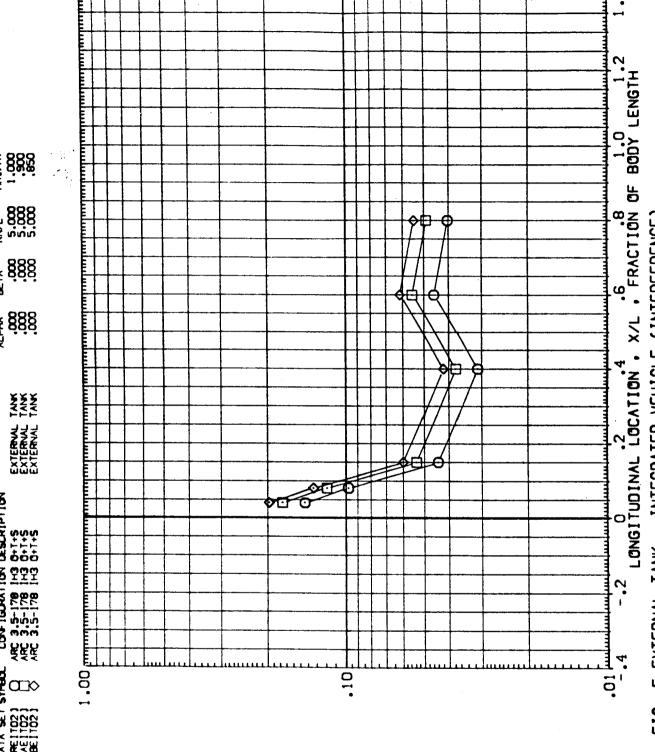
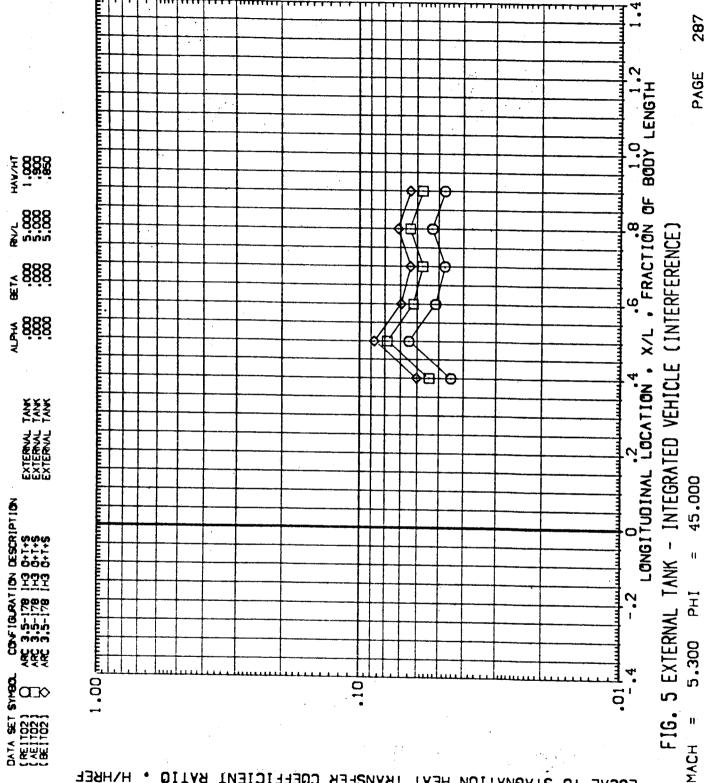
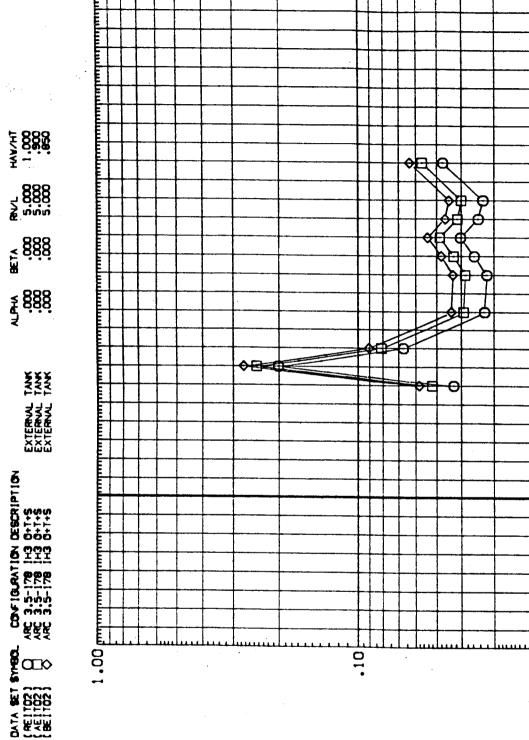


FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 000. Hd 5,300

286 PAGE



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO H\HKEE



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



PAGE

288

LONGITUDINAL LOCATION , X/L , FRACTION OF BODY LENGTH

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

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H d

5,300

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289 PAGE LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) **♦₽**+**©**E 900.08 5,300 10. 14. 01. 1.00

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888

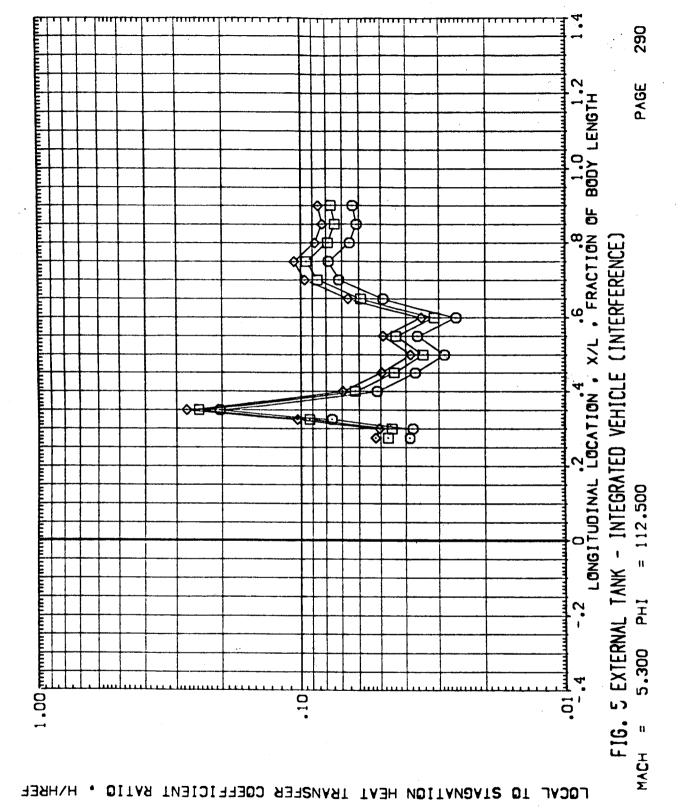
₹ 888

> EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

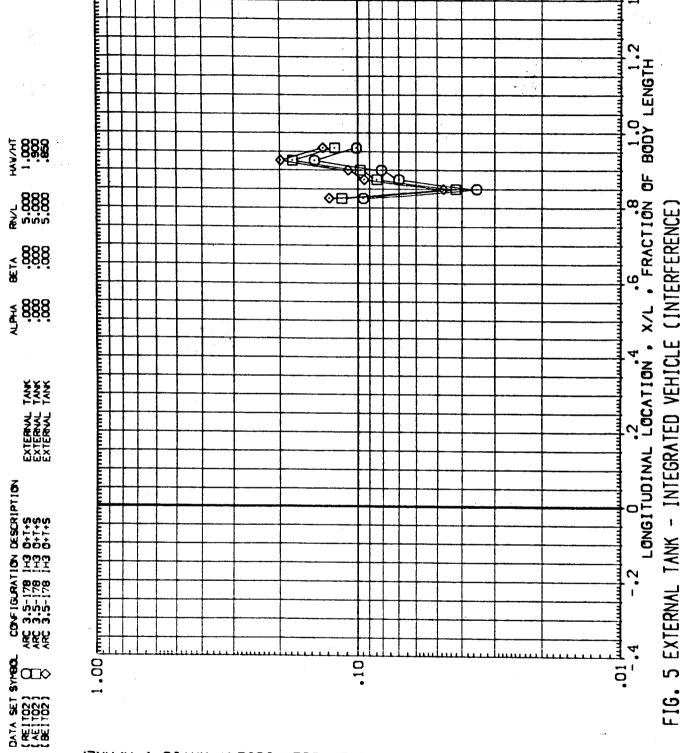
EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 PATA SET SYNESS. (RE1762) (RE1762) (RE1762) (RE1762)



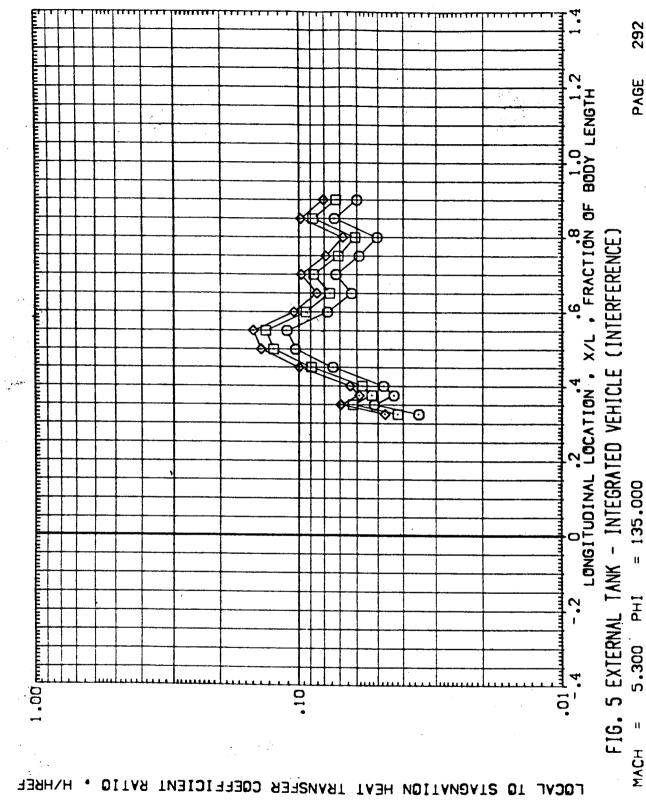


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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF



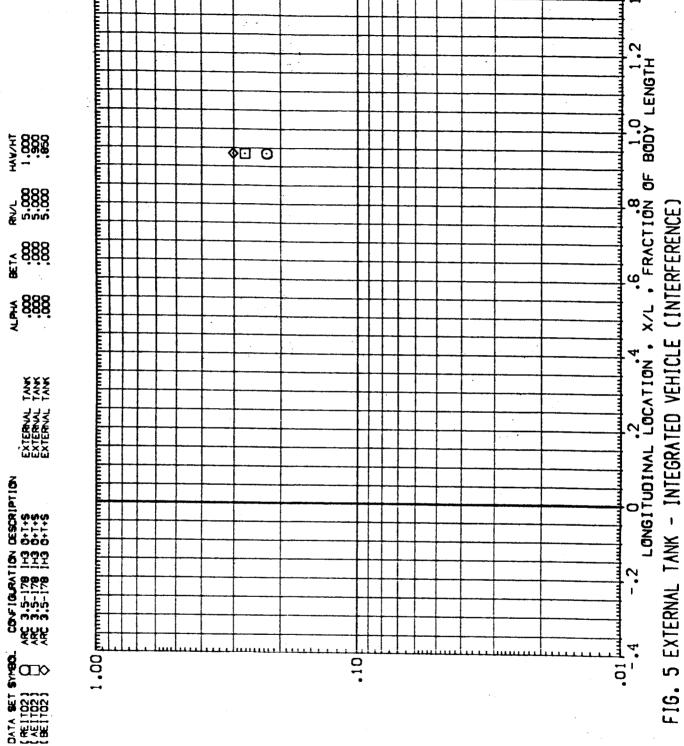


= 151.000

Hd.

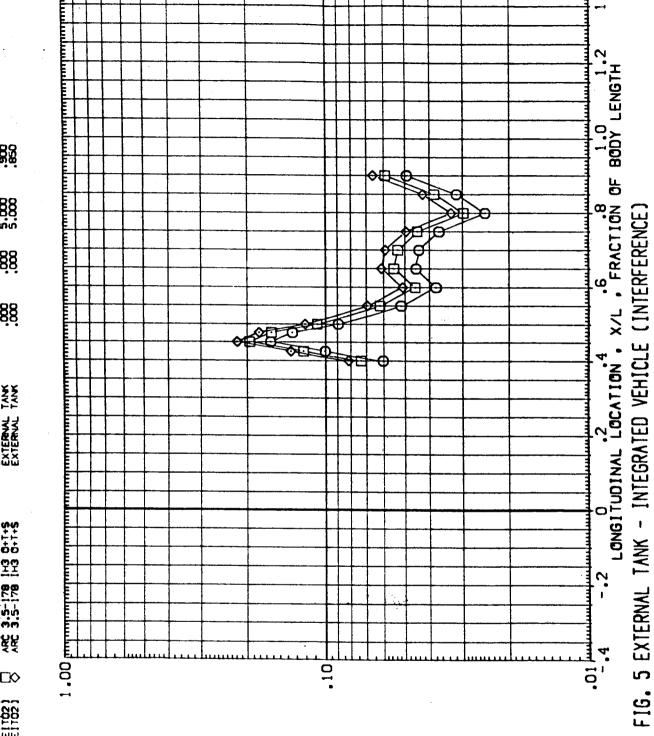
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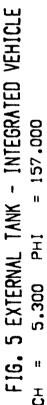
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₹ \$888 CONFIGURATION DESCRIPTION AND 3.5-178 IH3 0-1+5 AND 3.5-178 IH3 0-1+5 AND 3.5-178 IH3 0-1+5 DATA SET SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETTOS SYMBOL CRETT



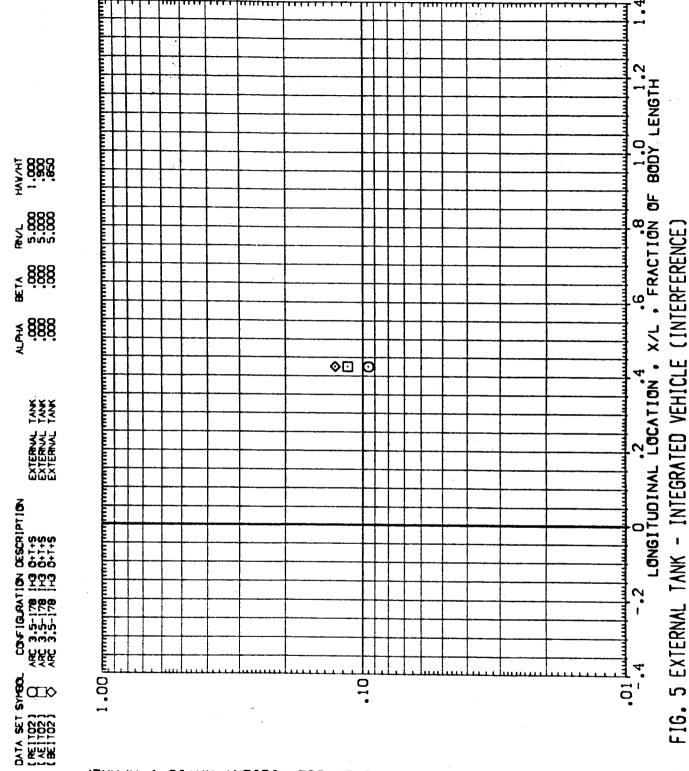






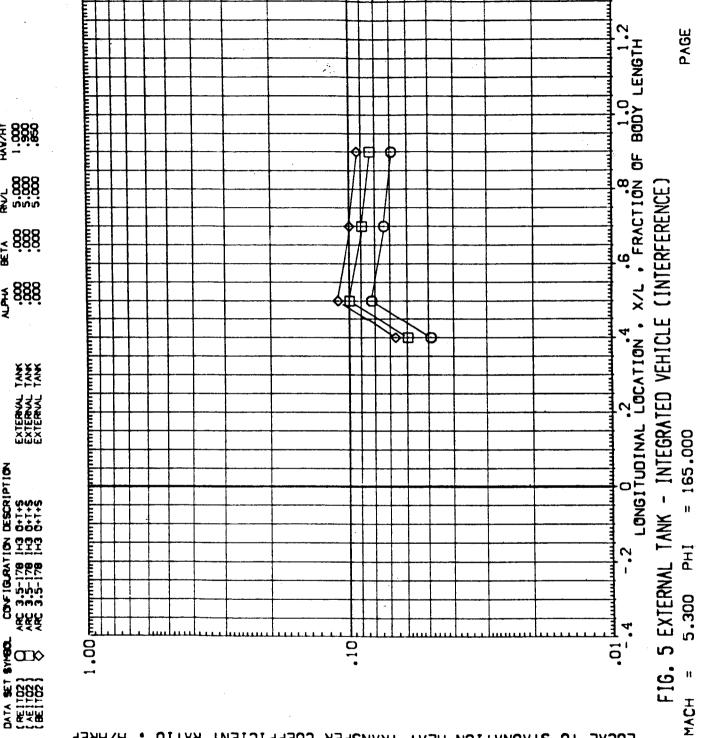
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

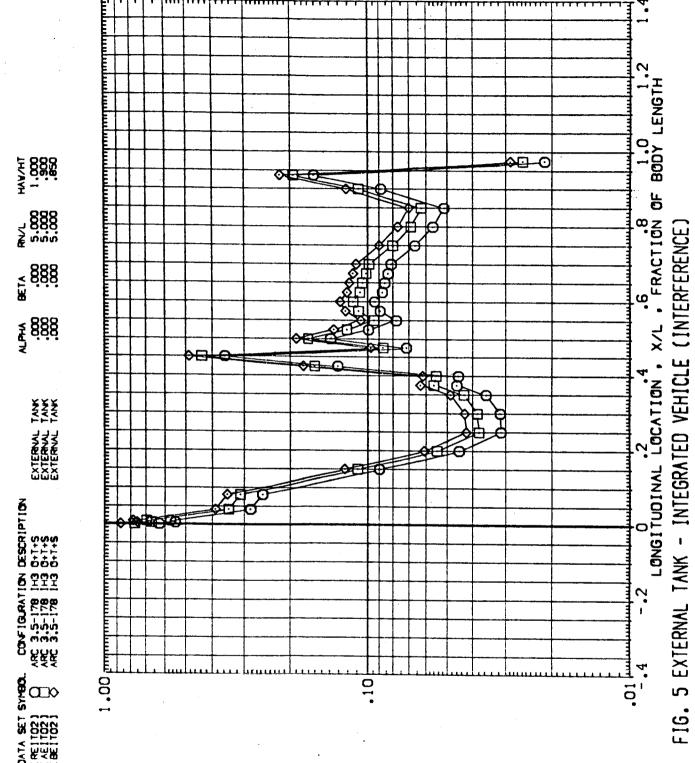
EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK COVFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ğan»





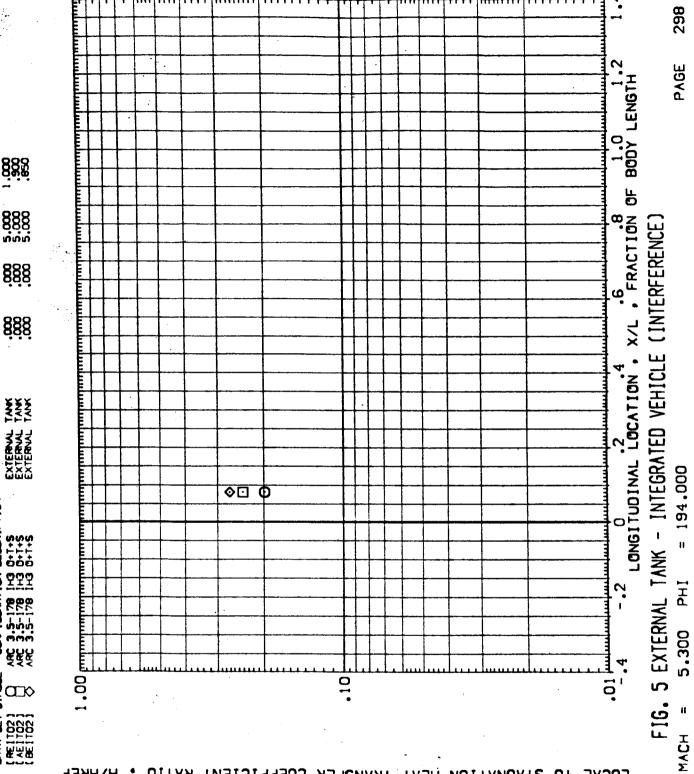
296

= 180,000



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . H/HREF

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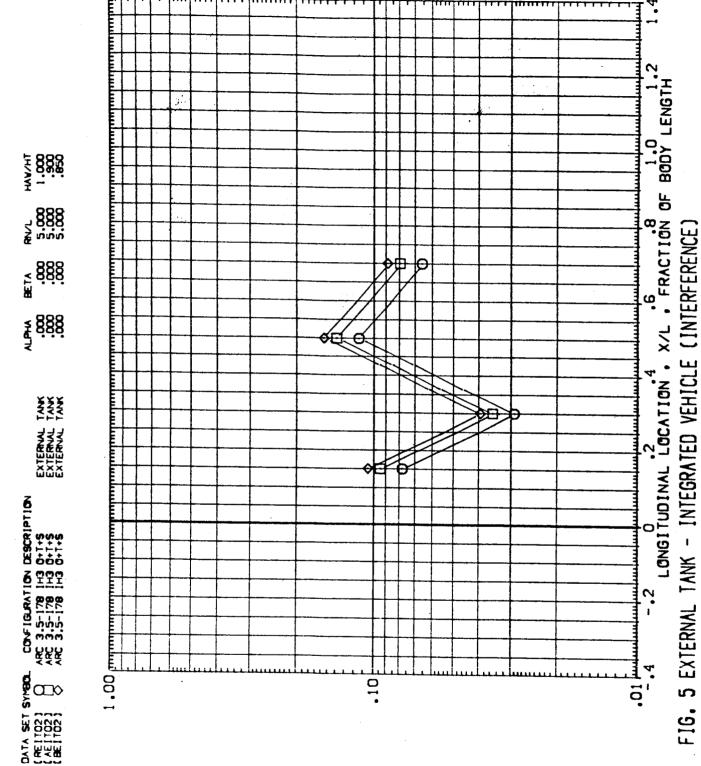




= 196,000

5,300

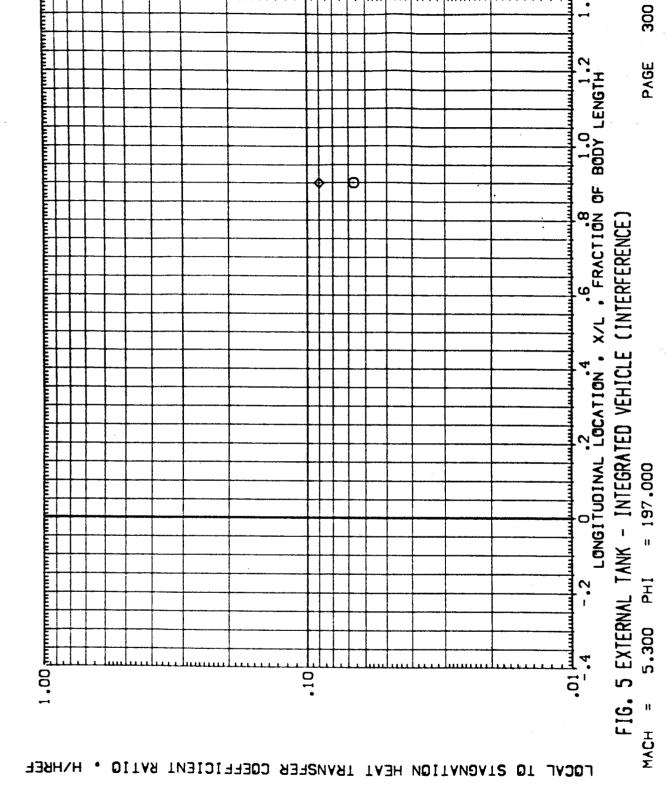
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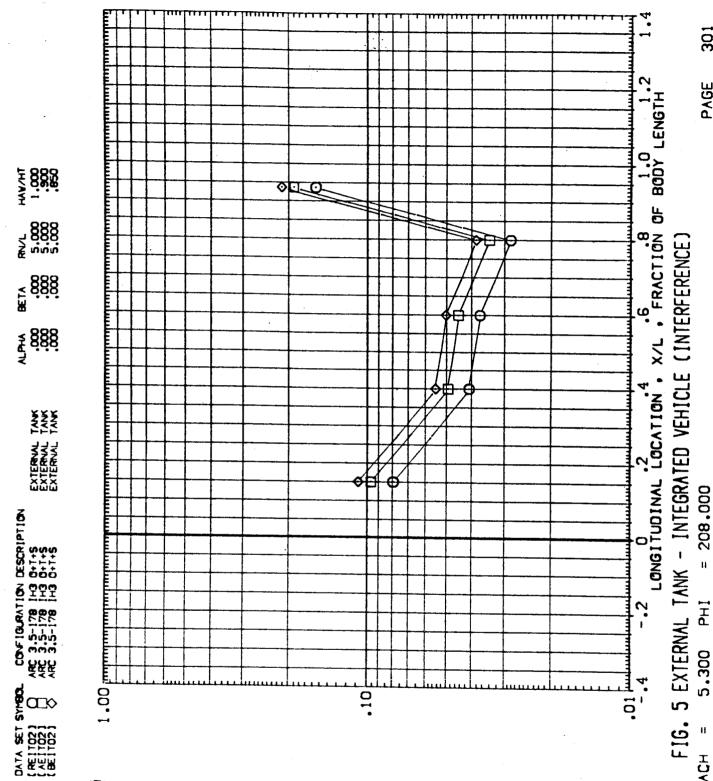
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DATA NOT ANAILABLE
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14/4/1 0000 0000 00000



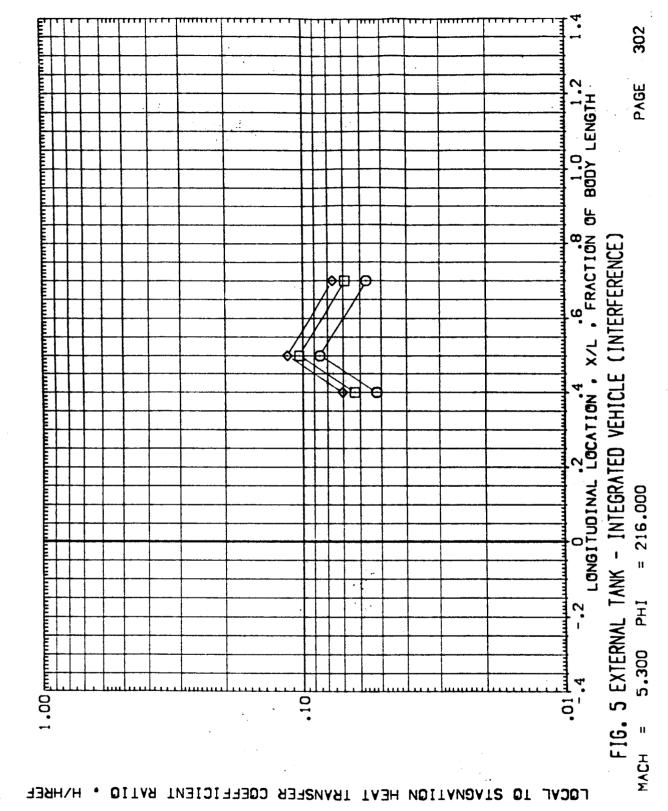




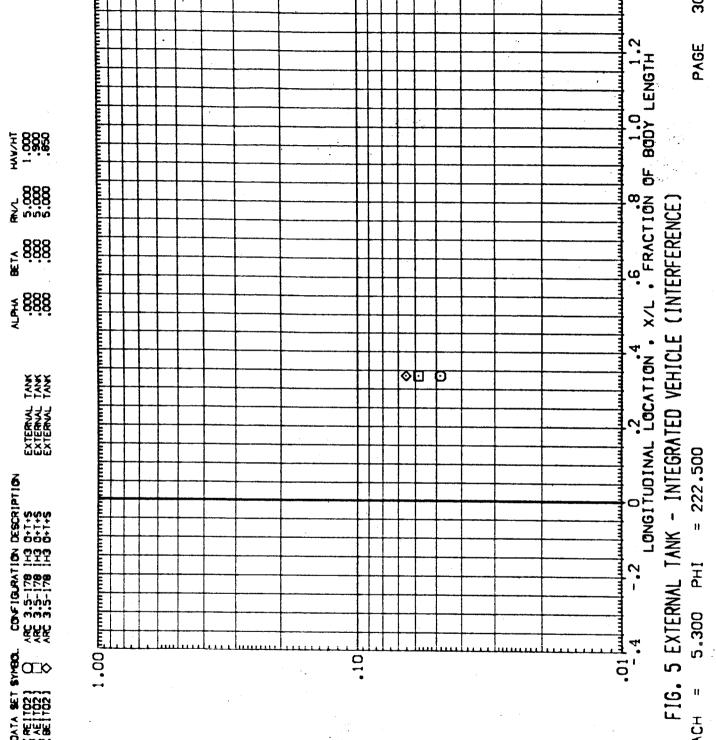
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ ოოო 888 888 # 8886 8886 £ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ∞ DATA SET (RE 1702) (RE 1702) (RE 1702) (RE 1702)

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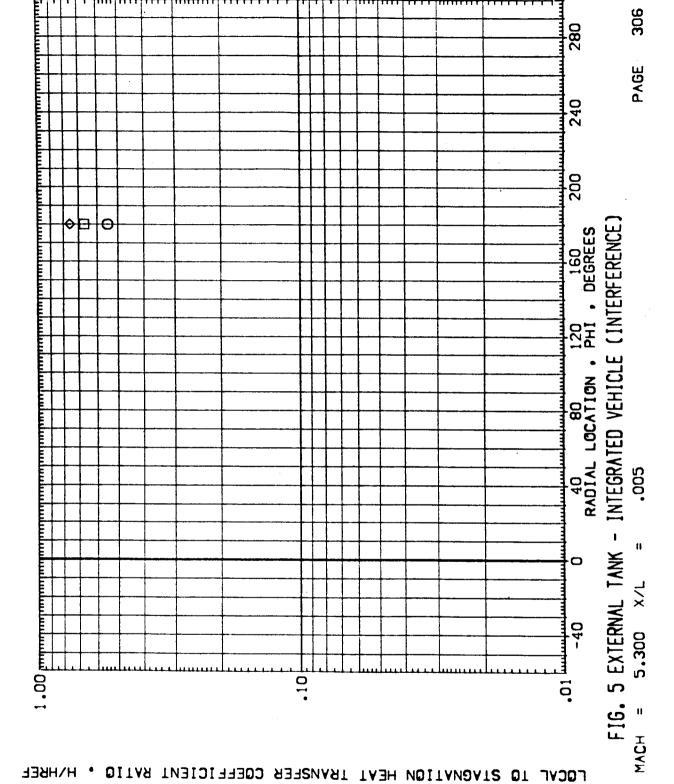


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMRER

304 LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH PAGE FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) = 229,000 1 •00 բուդուդյուդուդուդուդուդուդ PH. 5,300 DATA SET SYNBOL (RE1102) (AE1102) 101. MACH = יי ר**מכ**ער IQ SIVENVIION HEVI IBVNSEER COEFFICIENI RATIO



1 500 m EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+15 ARC 3.5-178 H3 0+15 ARC 3.5-178 H3 0+15 PATA SET STABO (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (RET 1252) (R





308 280 PAGE 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION, PHI, DEGREES 4 \$888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 0 1 •00 քուդուորուդուդուդու 5.300 -40 10 æ <u>.</u> DATA SET (RE 1702) (AE 1702) (BE 1702)

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



280 240 200 40 80 120 160 RADIAL LOCATION, PHI, DEGREES ¥ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 1 • 00 բուդուդուդուդուդ PATA SET SYMBO. (RE1702) (AE1702) (BE1702) <u>.</u>

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



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INTEGRATED VEHICLE (INTERFERENCE)

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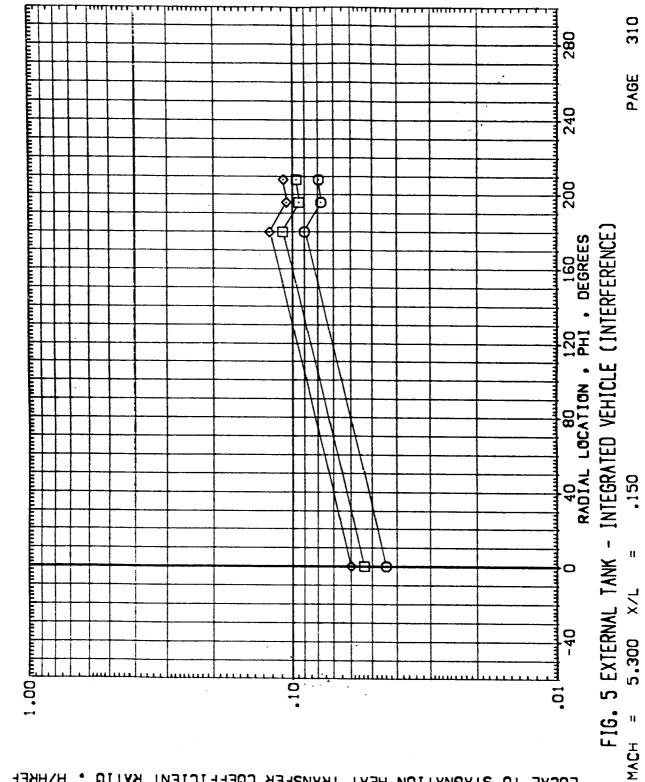
FIG. 5 EXTERNAL TANK -

5.300 X/L

309 280 200 ₹ ოოო \$888 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION , PHI , DEGREES 6000 6000 6000 6000 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 FIG. 5 EXTERNAL TANK -1 • 00 քուդոարուդուդապատր 5,300 10 0. DATA SET ((RE1102) (AE1102) (BE1102) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

₹ ოოო 9889 9889 7 888 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK COF 104-RATION DESCRIPTION ARC 3.5-178 H43 0+1-5 ARC 3.5-178 H43 0+1-5 ARC 3.5-176 H43 0+1-5 a

DATA SET (RE1102) (AE1102) (BE1102)



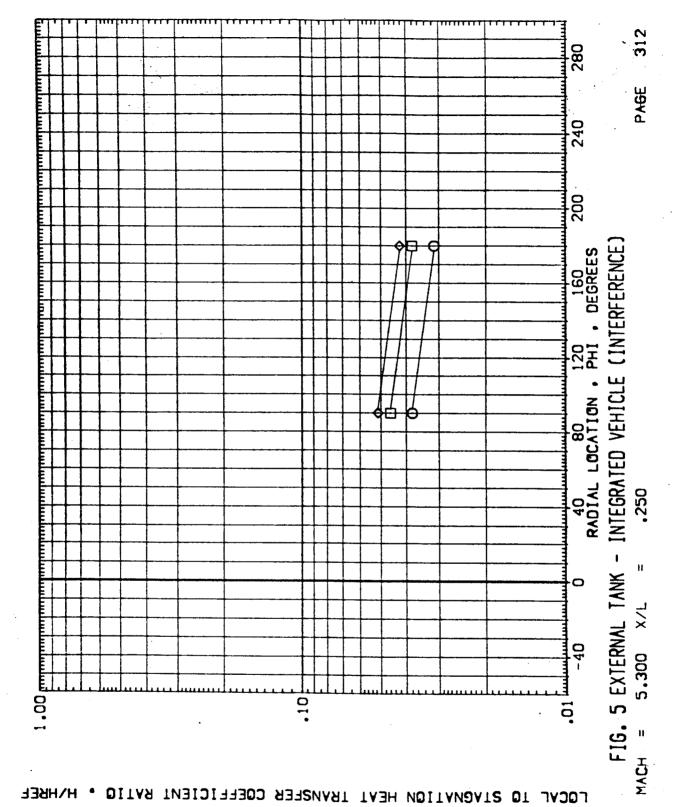
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



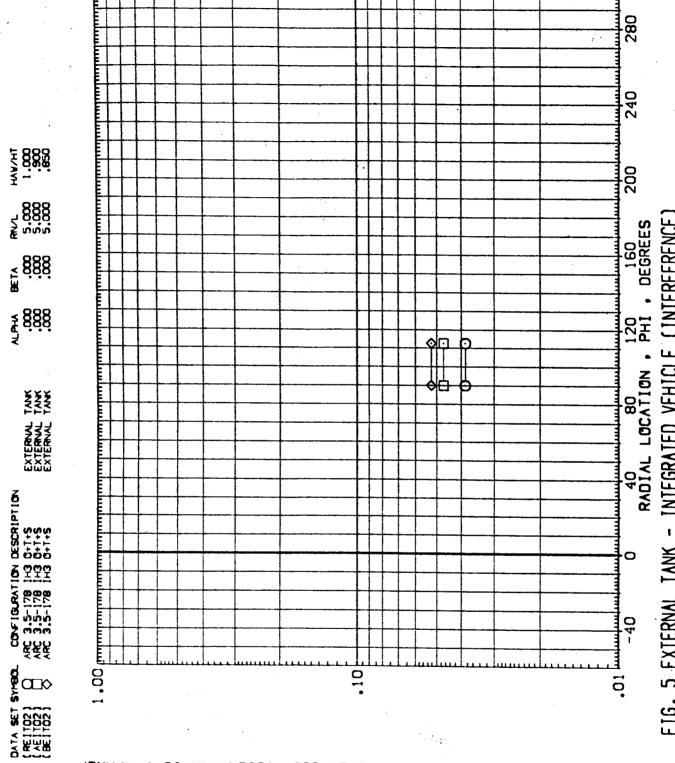
₹ -888 888 \$ n.n.n. \$686 868 ₹ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 DATA SET SYMBO.

(RE 1702)

(BE 1702)







LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

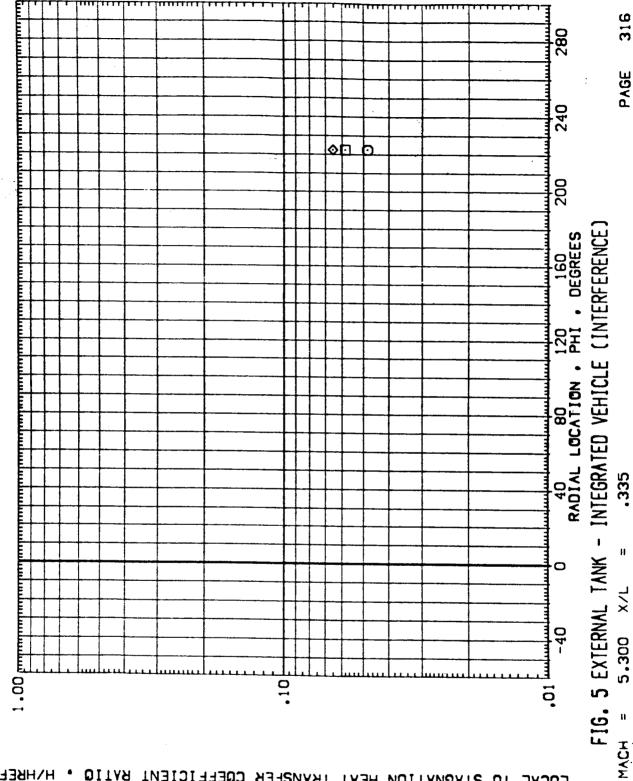


HAYH 1888 1888 1888 ₹ ოოო 988 988 ₹ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 DATA SET SYMBO.

(RE 1702)

(BE 1702)

(BE 1702)

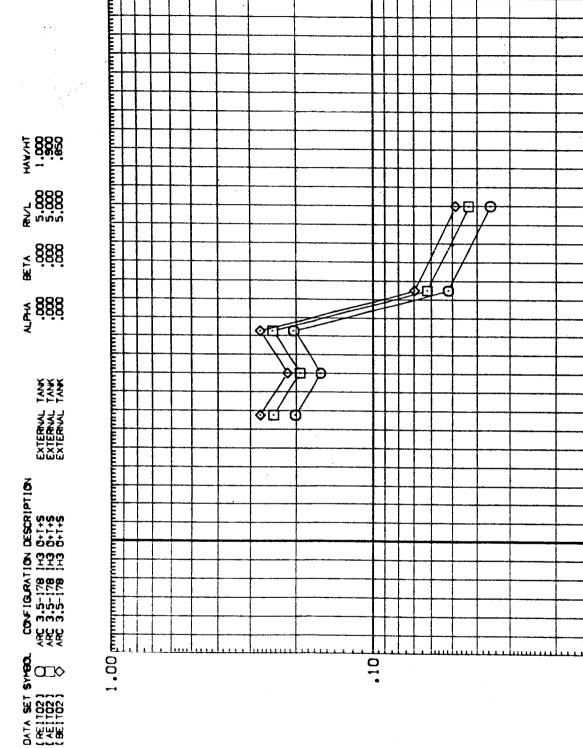


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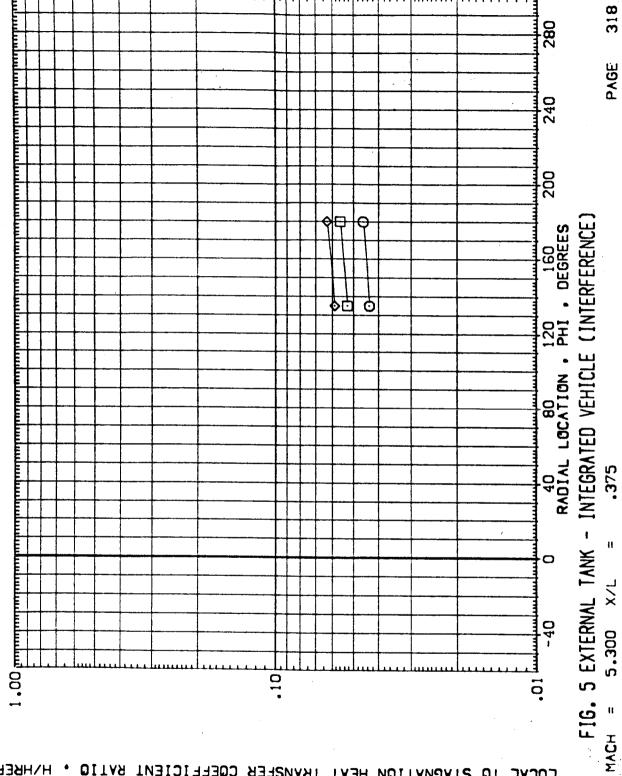
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 110N DESCRIPTION 1H3 Q+1+S 1H3 Q+1+S 1H3 Q+1+S DATA SET (RE1102) (AE1102) (BE1102)

1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000

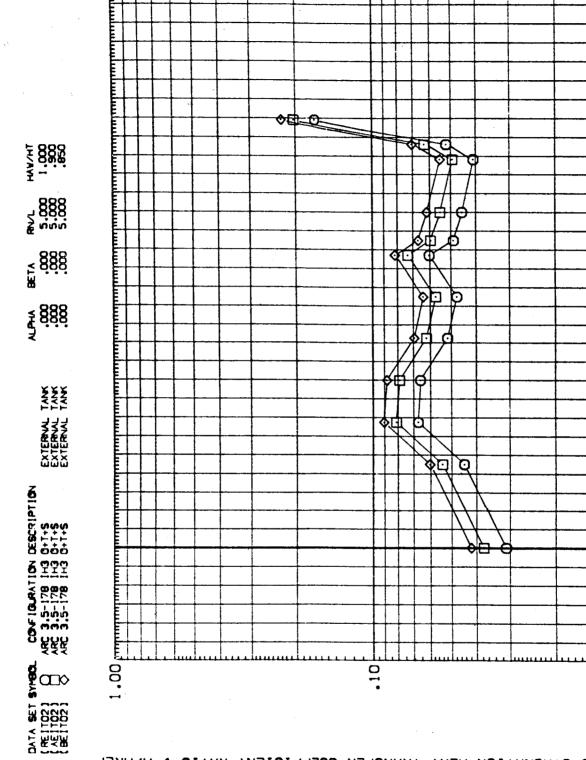


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO



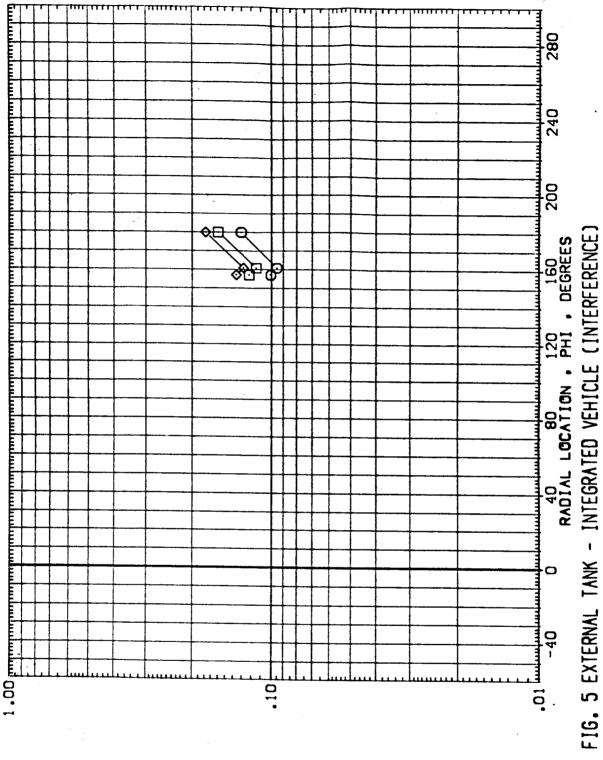
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

\$ nnn \$ 888 ₹ 888 Å 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION AND 3.5-178 IH3 0+1-5 APC 3.5-178 IH3 0+1-5 APC 3.5-178 IH3 0+1-5 1.00 pm **ğ**a⇒ DATA SET (RE 1702) (AE 1702) (BE 1702)



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



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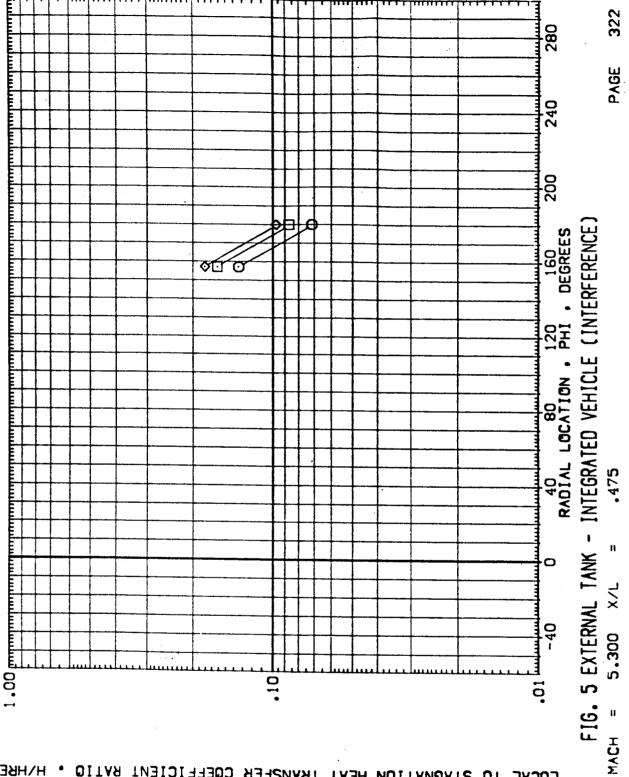
5,300

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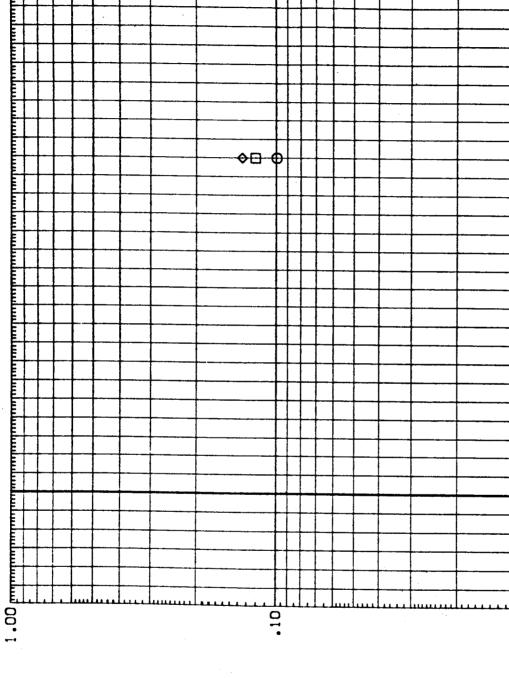
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1 .00 քոդոպրարարարարարարություրություրություրությություրությություրություրություրություրությություրություրությ ¥ -8888 ± 8888 # 888 888 COSTIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1-5 ARC 3.5-178 IH3 0+1-5 ARC 3.5-178 IH3 0+1-5 0A7A SET SYNBO. (**E1702) (**E1702) (**E1702) (**E1702) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF





323 240 ₹ -8888 ± 8888 200 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES # 8886 8886 £ 888 1 .00 քոպոտրոպոտրութությունութությումը ուղևություցիացիություն ¥¥¥ ¥¥¥ MO O CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+145 ARC 3.5-178 H3 0+145 ARC 3.5-178 H3 0+145 FIG. 5 EXTERNAL TANK -**%** CIX 10 0. DATA SET ((RE 1102) (AE 1102) (BE 1102) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRE



280

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200

40 80 120 160 RADIAL LOCATION . PHI . DEGREES

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<u>.</u>

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

.525

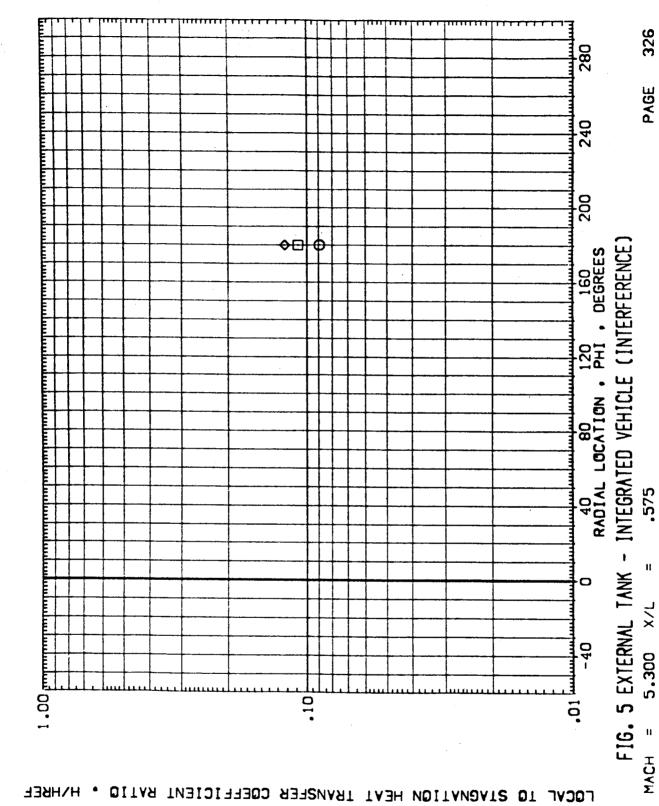
×

5.300

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PAGE

¥ -8888 \$ 0000 \$886 \$886 # 888 888 ¥ 888 CONFIGURATION ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC 3.5-178 ARC DATA SET \$YMBQ.
[RE1702]
[AE1702]
[BE1702]





328 280 PAGE 240 HAW/HT - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... - ... 200 ♦□ INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION , PHI , DEGREES EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .625 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 1 •00 քաղոտրարարութութու FIG. 5 EXTERNAL TANK -10. 0. $\alpha \gg$ DATA SET (RE1702) (AE1702) (BE1702) MACH ÷. LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



329 280 PAGE 240 ₹ -8889 1880 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)
H = 5.300 ×/L = .650 AD 80 120 160 RADIAL LOCATION . PHI . DEGREES ₹ **9 9 9 9 9 ⊗**□ Q ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK $\odot\Box$ O CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 DATA SET SYMBO.

[RE | 102 | O |

[RE | 102 | O |

[BE | 102 | 10 0. MACH = LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

H/WAT - 6886 \$ nnn 888 888 ¥ 8866 8000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 110N DESCRIPTION
11-3 0+1+5
11-3 0+1+5
11-3 0+1+5 1 .00 բուդուպուպ 10 α DATA SET (RE1102) (AE1102) (BE1102)

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF



MACH

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FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

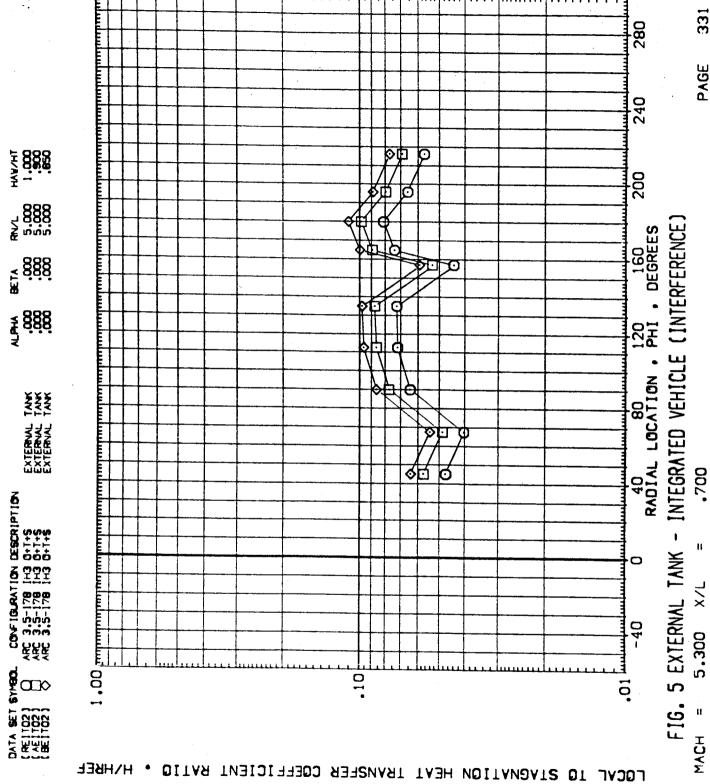
280

200

160 • DEGREES

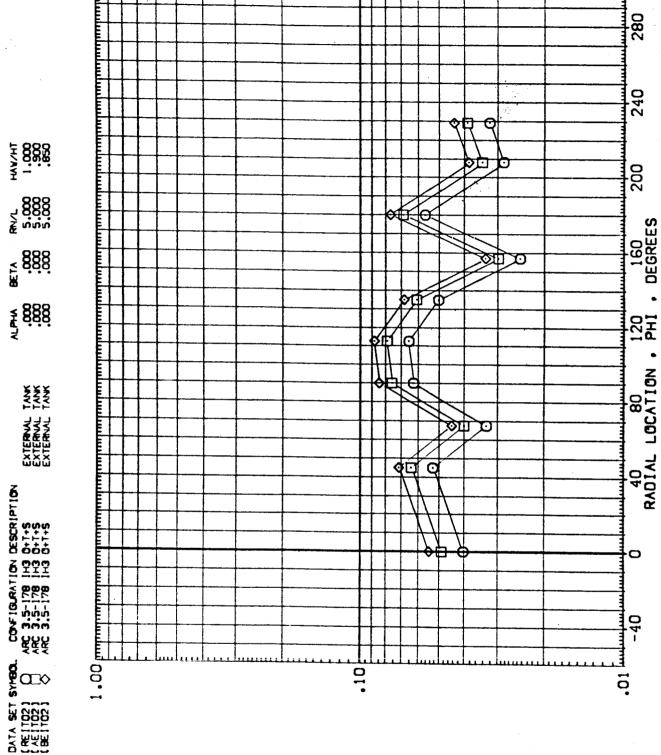
40 80 120 RADIAL LOCATION , PHI

0





333



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ ოოო 988 988 ₹ 888 ♦⊡ 0 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IHS 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 PATA SET SYMBO.

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



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40 80 120 160 RADIAL LOCATION , PHI , DEGREES

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FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

.825

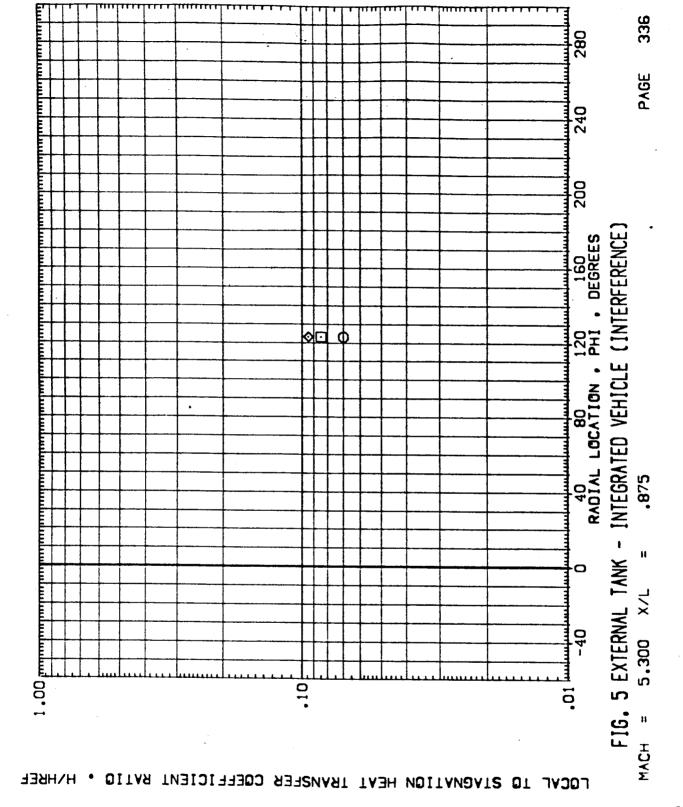
×

5,300

MACH

335 280 PAGE 240 200 ₹ ოოო 1989 1989 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) AO 80 120 160 RADIAL LOCATION , PHI , DEGREES # \$886 \$880 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .850 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 1 • 00 քուդրադոտրադարույ 5.300 X/L DATA SET SYMBOL. (RE1702) (AE1702) (BE1702) 10 0. LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

ર્ક્ષ ભ્રમ્ **2000 2000** ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 DATA SET (RE1702) (AE1702) (AE1702) (BE1702)



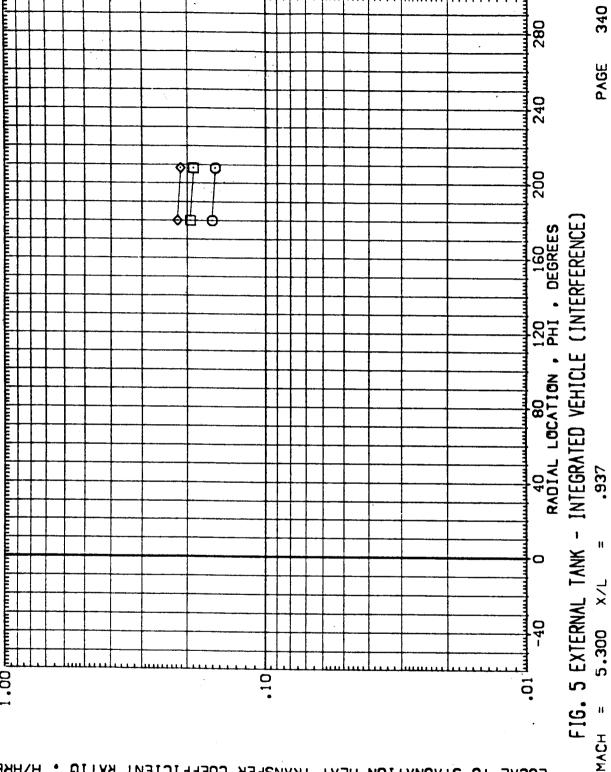


337 PAGE 表 886 888 200 O FIG. S EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES Ų. # ₹ 888 ¥ 888 0 ¥¥¥ ¥¥¥ 하 6 900 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 1 .00 բողոտրադապաղ 5.300 X/L 10 0. FOCYF 10 SIVENVIION HEVI IBVNSEER COEFFICIENT RATIO . HARREF

338 280 PAGE ₹ -8888 -200 ₹ ოოო 888 888 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) H = 5.300 X/L = .925 40 80 120 160 RADIAL LOCATION , PHI , DEGREES # 888 \$88 ♦⊡ O EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5] [-DATA SET SYNGO. (RE1702) (RE1702) MACH STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF רסכער נס



₹ -888 1888 \$ n.n.n. \$888 888 # 888 888 ₹ \$888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 1100 DESCRIPTION
113 Q+1+5
113 Q+1+5
113 Q+1+5 1 •00 քաղոտղոտրություրու ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | PATA SET SYMBOL.
(*RE1702)
(*RE1702)
(*RE1702)

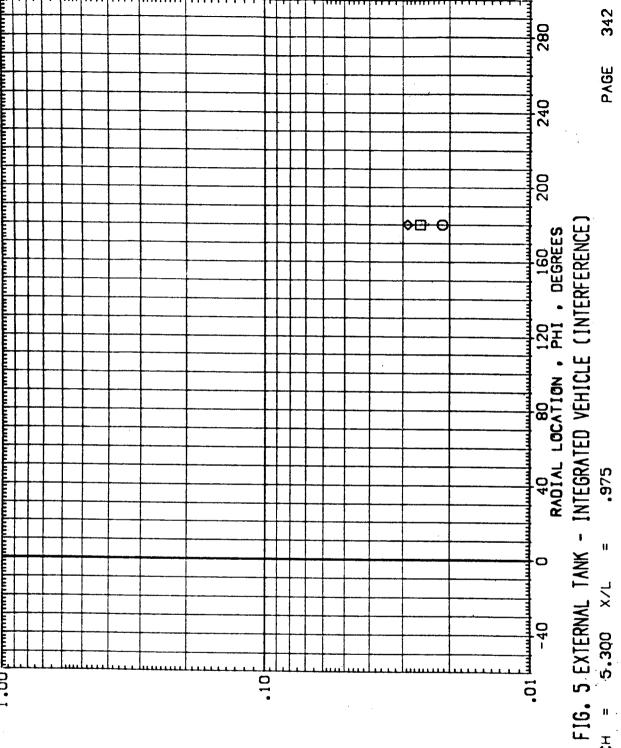


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



PAGE 240 # 2888 1 8888 1 8888 200 ર્કે ભળણ 5000 0000 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) ₹ 888 ₹ 888 ♦⊡ EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION AND 315-178 IH3 0+1+8 AND 315-178 IH3 0+1+5 AND 315-178 IH3 0+1+5 1 • 00 բոդուդուդուդուդուդ 5,300 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

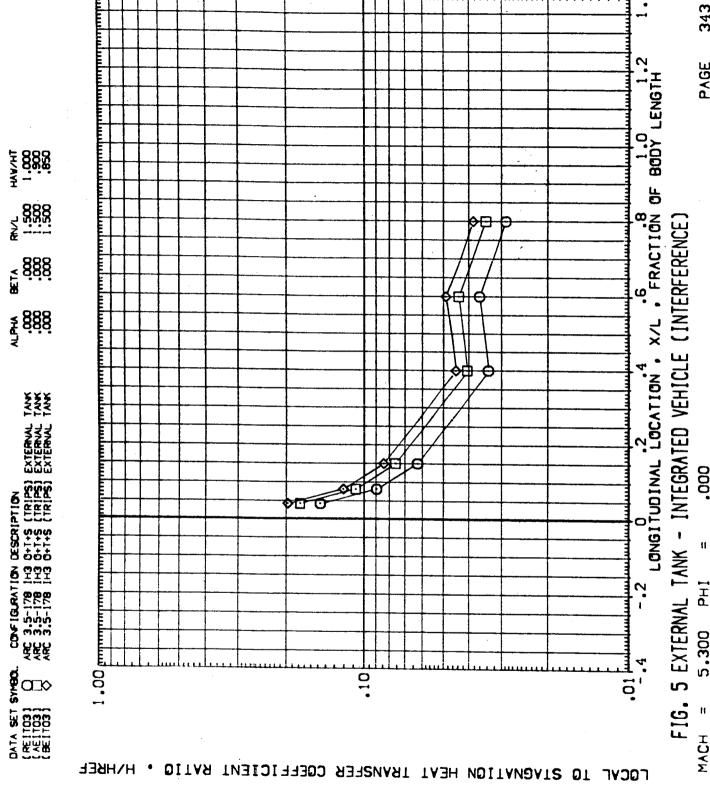
¥ - 8888 1 8888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 DATA SET SYNED.
(RE1102)
(RE1102)
(RE1102)

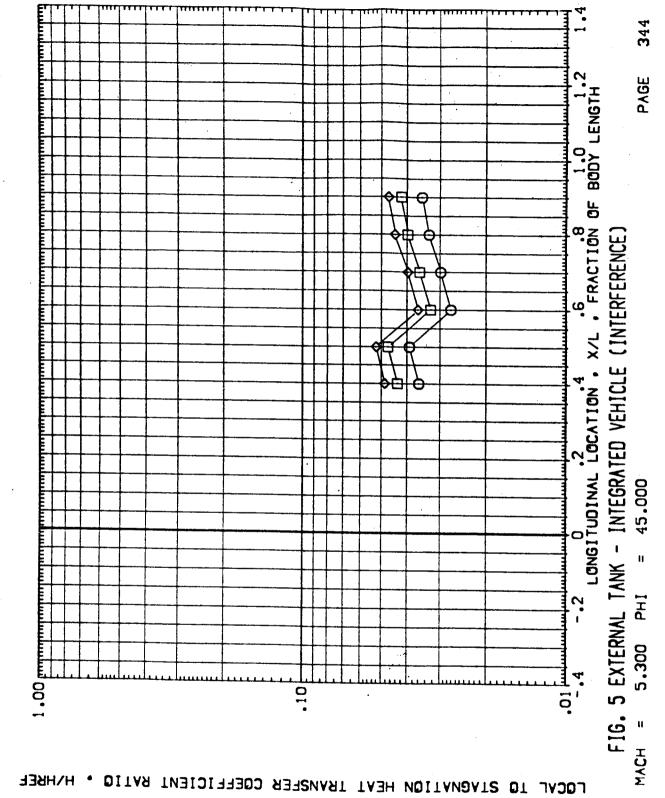


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER



5,300





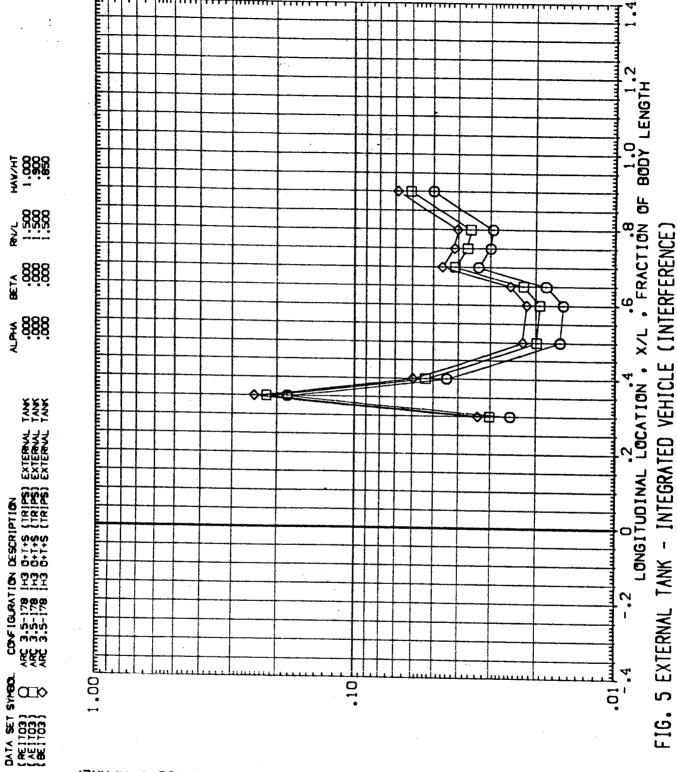


67,500

H H

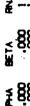
5,300

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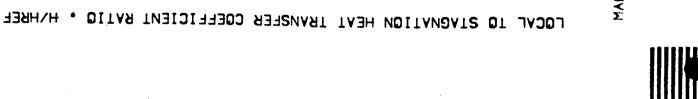
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

1.00 քուդուպուպուպուդու









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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH

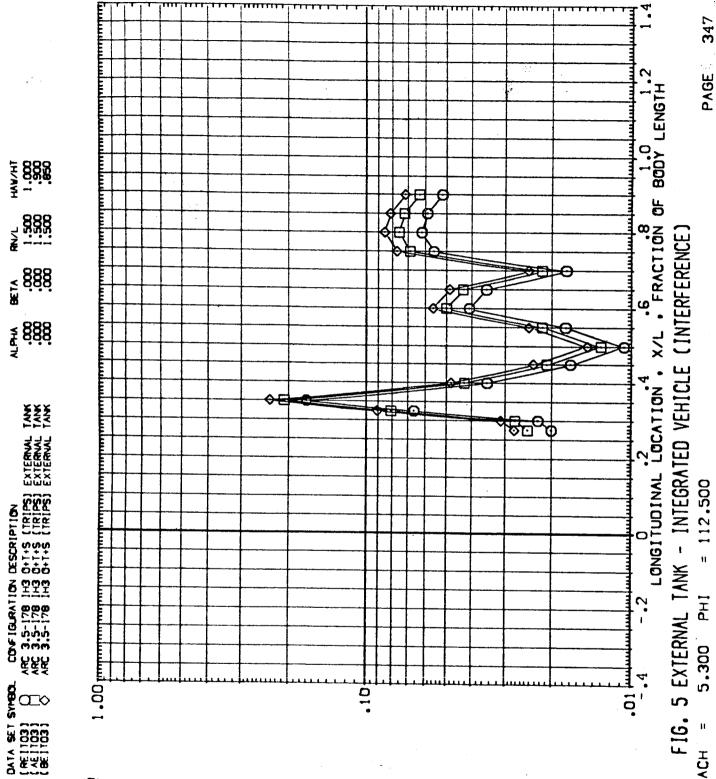
FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE

10.

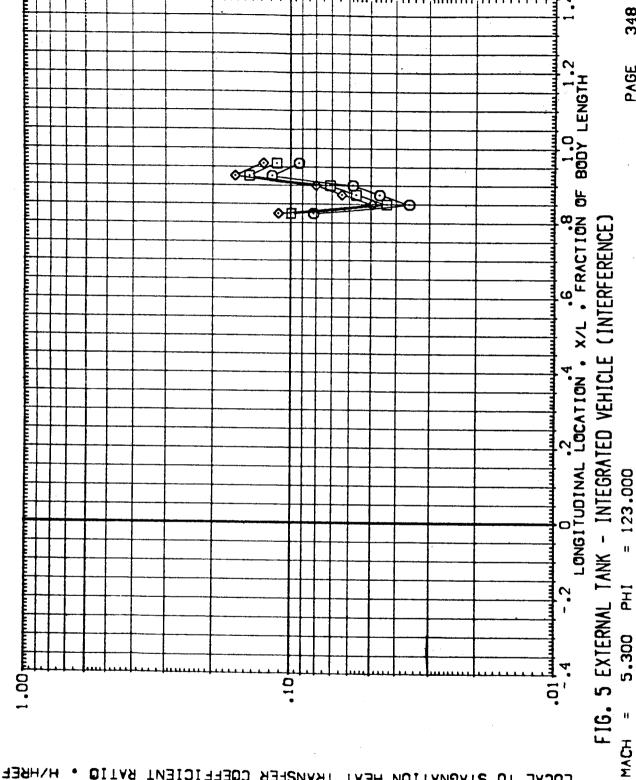
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PHI

5,300



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF



TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

H/WH 0869

₹ 888 888

¥ 888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS)

PATA SET SYNED. (**E1103) (**E1103)

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רסכער



\$666 \$000

¥ 888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

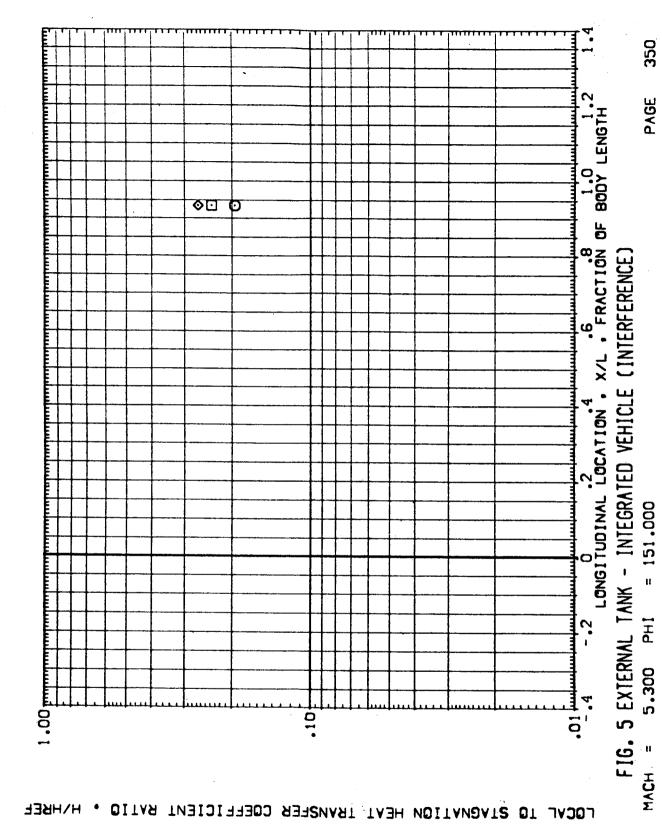
0+1+5 (TRIPS) 6 0+1+5 (TRIPS) 6 0+1+5 (TRIPS) 6 0+1+5 (TRIPS) 6

ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0

DATA SET 9 (RE 1103) (AE 1103) (BE 1103) 1 • 00 gmm

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

₹ ----888 # ₹ 888 ¥ 888 10N DESCRIPTION
1H3 0+1+5 (TRIPS) EXTERNAL TANK
1H3 0+1+5 (TRIPS) EXTERNAL TANK
1H3 0+1+5 (TRIPS) EXTERNAL TANK ARC 3.5-178 11 ARC 3.5-178 11 ARC 3.5-178 11 ARC 3.5-178 11 0ATA SET SYNBO. (RE1103) (AE1103) (RE1103)





FRACTION OF BODY LENGTH FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) LONGITUDINAL LOCATION . X/L = 157,000 PH. 5.300 1 .00 յրողուդ 0 5, LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF

HAY: 000.00

888 \$88

¥ 888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

0.1145 (TRIPS) E 0.1145 (TRIPS) E 0.1145 (TRIPS) E 0.1145 (TRIPS) E

ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0

DATA SET SYMBO.

(RE 1703)

(RE 1703)

(RE 1703)

351

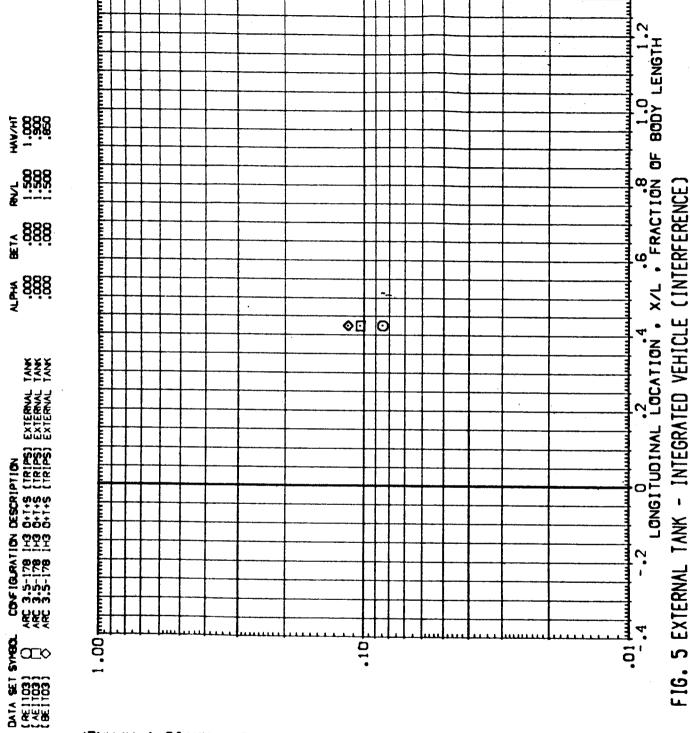
PAGE

= 161,000

PHI.

352

PAGE

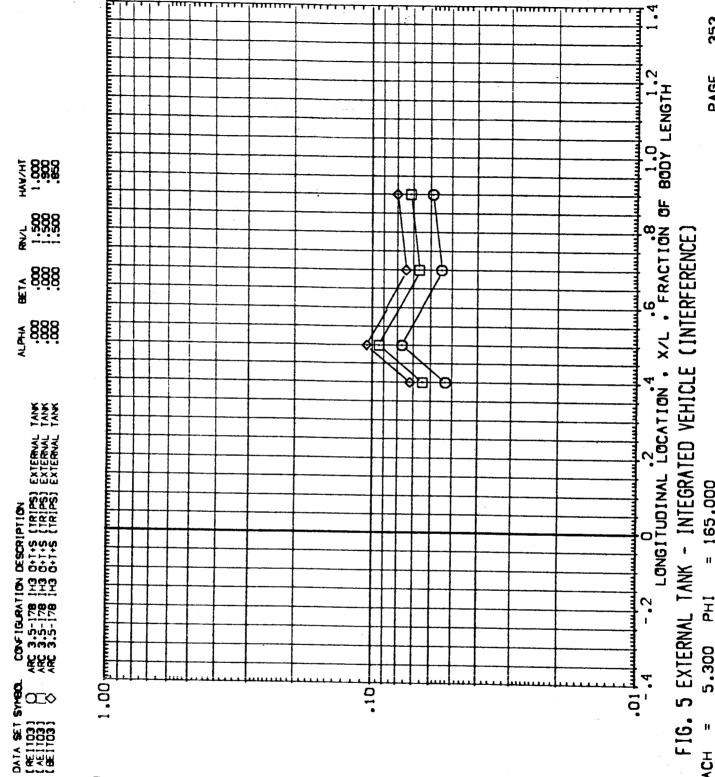


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

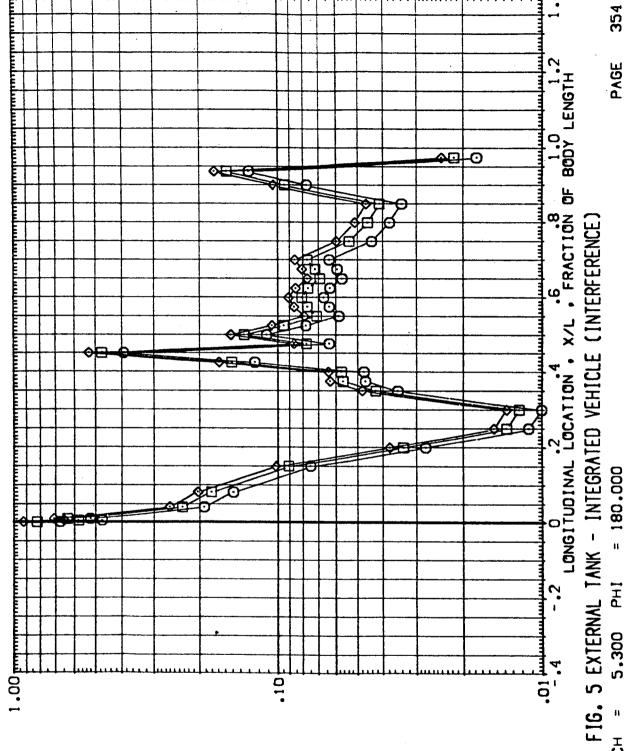
= 165,000

5,300

MACH



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



₹ 888

₹ 888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

113 0-11-5 (TRIPS) E 113 0-11-5 (TRIPS) E 113 0-11-5 (TRIPS) E 113 0-11-5 (TRIPS) E

ARC 3.5-178 11 ARC 3.5-178 12 ARC 3.5-178 12 ARC 3.5-178 12

PATA RET SYMBO.

(ARE 1333)

(BE 1333)

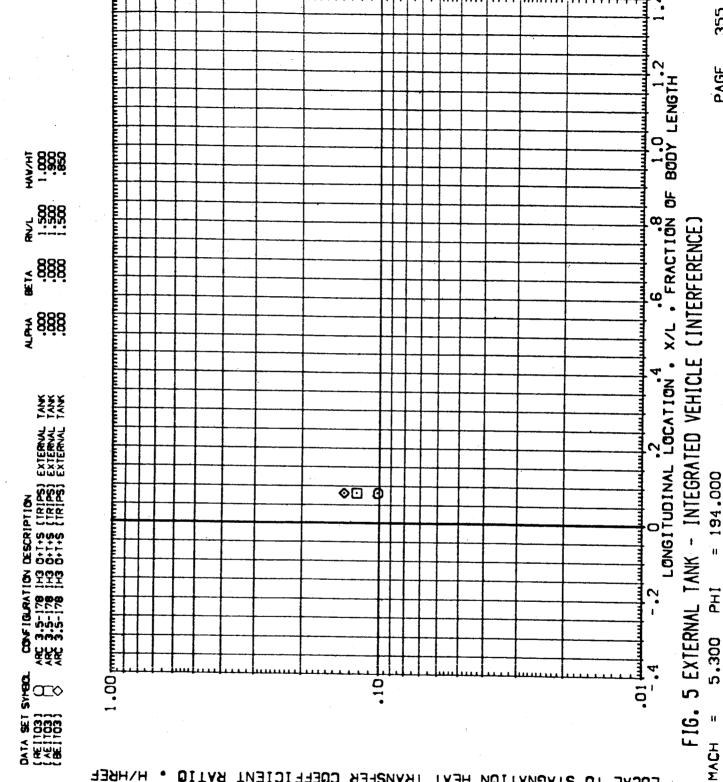
(CRE 1333)

(CRE 1333)

(CRE 1333)

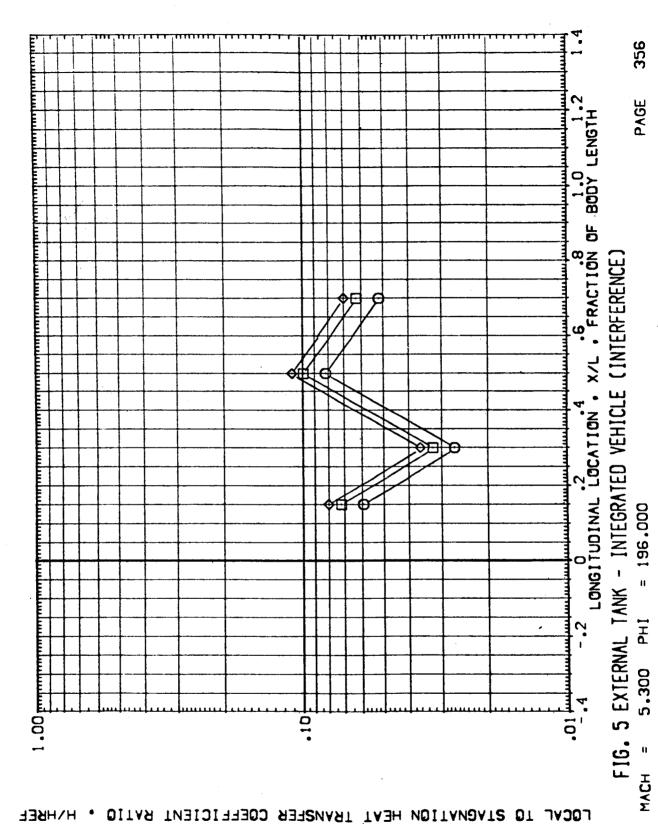
(CRE 1333)





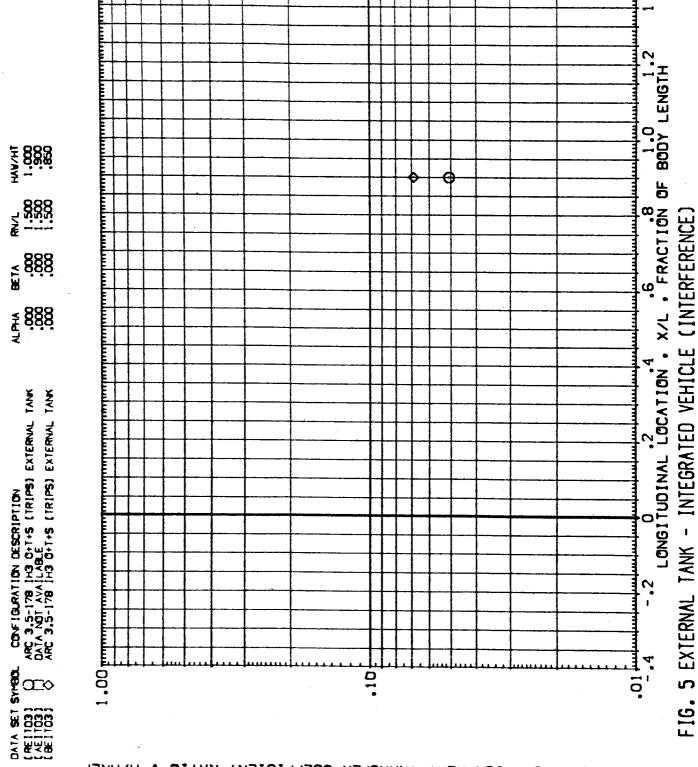
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO HVHREF







LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

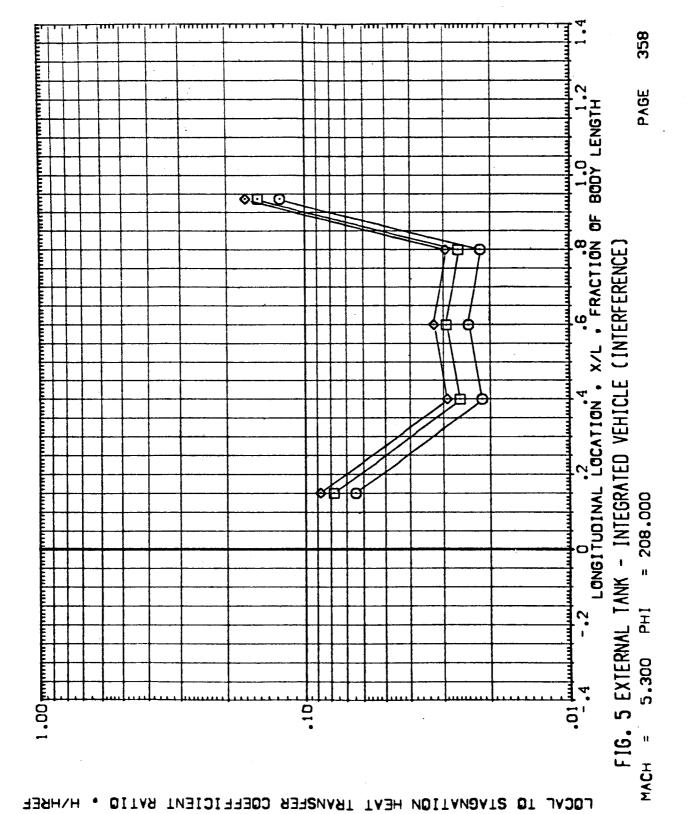


= 197,000

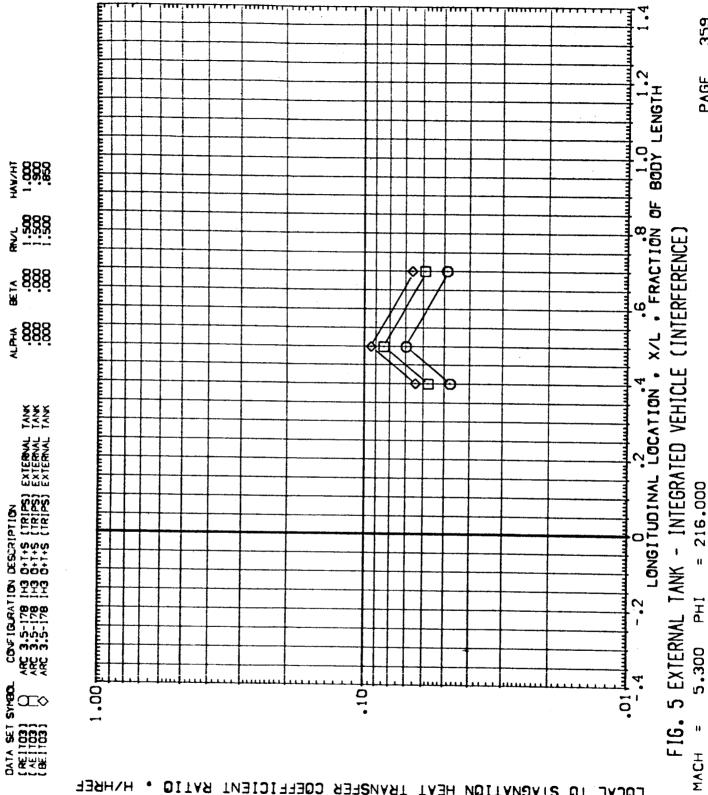
5,300 PHI

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表 6888 # 888 ¥ 888 XXX XXX EXTERNAL 1 EXTERNAL 1 EXTERNAL 1 10N DESCRIPTION
113 0+1+5 (TRIPS) E
113 0+1+5 (TRIPS) E
113 0+1+5 (TRIPS) E ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 |

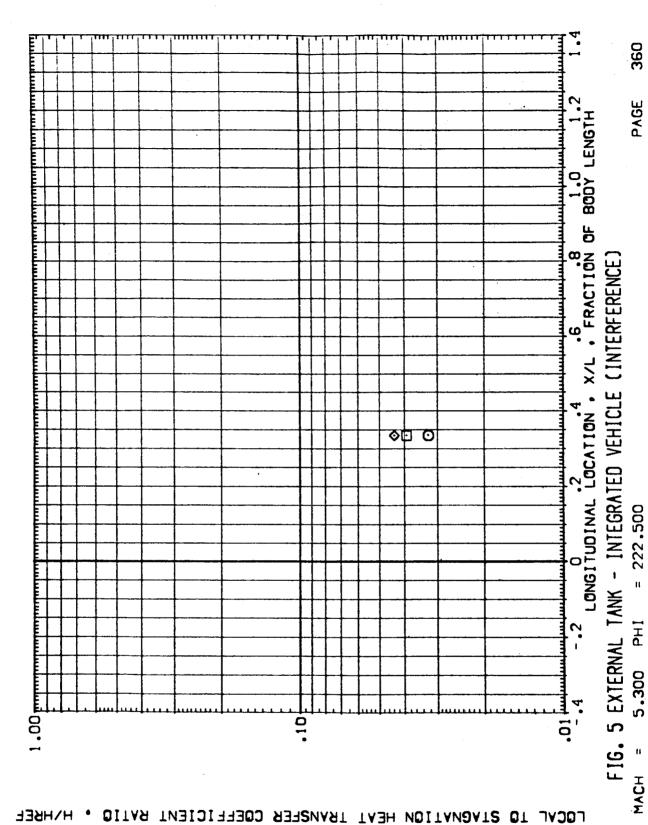






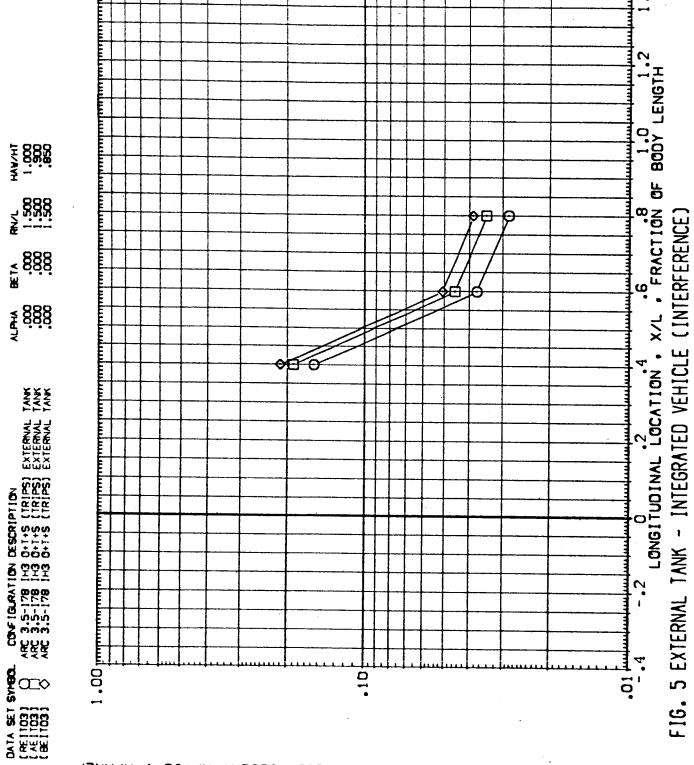
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMRER







5,300



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

HAV/HT 00099 ₹ 8886 8886 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) PATA SET SYNED.

(**E1103)

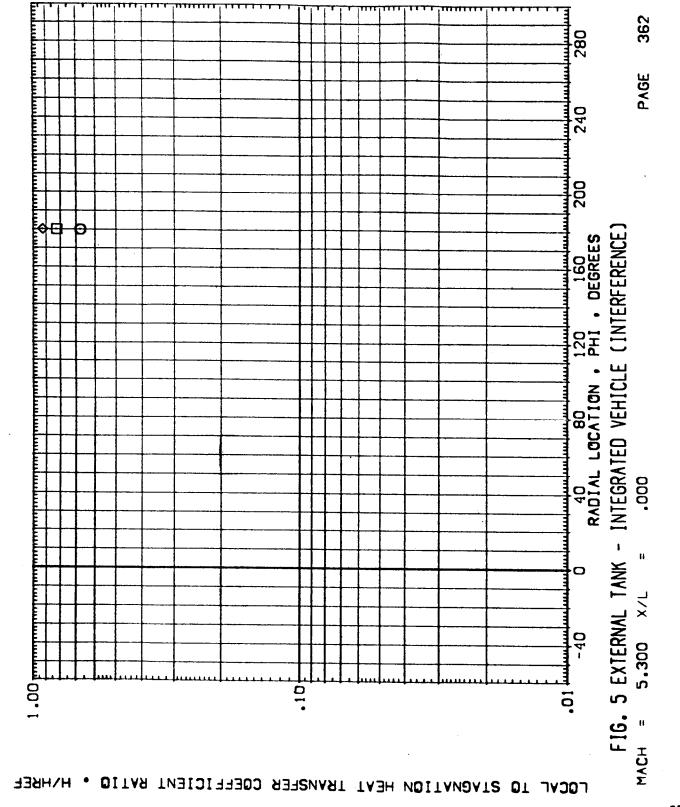
(**E1103)

(**E1103)

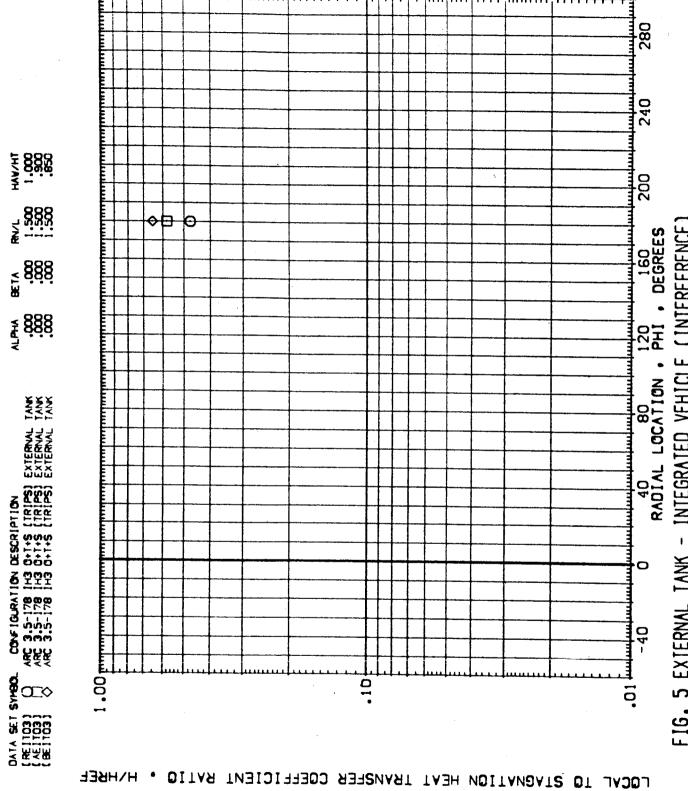
(**E1103)

(**E1103)

(**E1103)







364 PAGE 1.000 1.000 1.000 1.000 1.000 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)
H = 5.300 ×/L = .010 40 80 120 160 RADIAL LOCATION • PHI • DEGREES £ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) 0 PATA SET SYNBO. (RE1103) O 10 0.

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



365 280 PAGE 240 200 INTEGRATED VEHICLE (INTERFERENCE) AD 80 120 160 RADIAL LOCATION . PHI . DEGREES # 888 ¥ 888 ¥¥¥ ŽŽŽ CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) FIG. 5 EXTERNAL TANK 1.00 ը ապատարապատարա × -40 5,300 DATA SET SYNBOL.
[RE1103]
[AE1103]
[BE1103] 10 0 MACH TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF רפכעד

280 PAGE 240 HAW/HT 0009 0009 0009 200 **⊘**⊡ § ----888 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES # 888 888 4 8666 8666 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS ARC 3.5-178 IH3 0+1+5 (TRIPS ARC 3.5-178 IH3 0+1+5 (TRIPS FIG. 5 EXTERNAL TANK -100 ₹ 10. DATA SET SYNBOL (RELIGIO) (RELIGIO) (BELIGIO) 1.001 101 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

.080 × \ \ 5.300 MACH

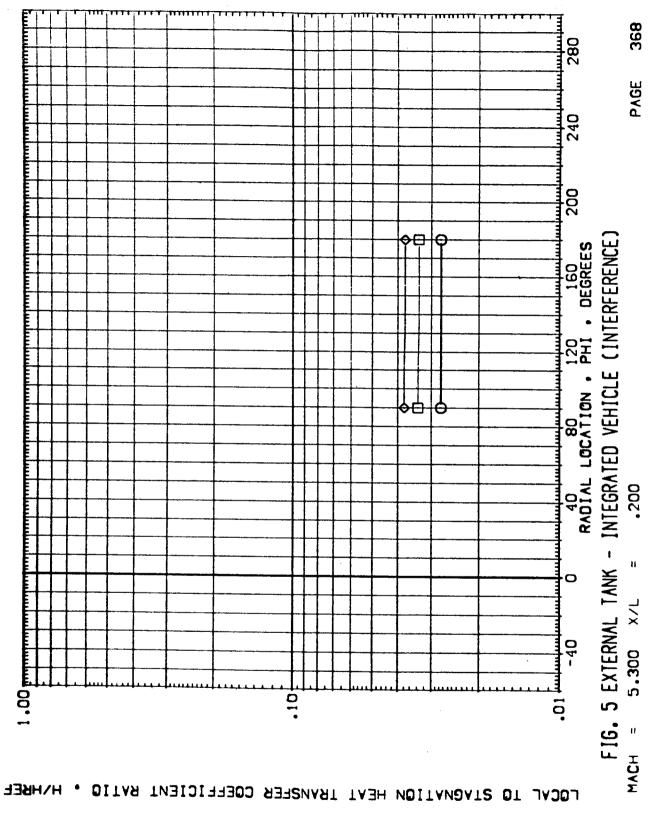
367 PAGE 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION . PHI . DEGREES # 8886 8886 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .150 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 1 .00 ըսպապար 5.300 DATA SET SYMBOL (ME1103) CA (AE1103) CA (ME1103) CA (M 0. <u>.</u> LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

¥ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) PATA SET SYNEOD.

(RE 1103.)

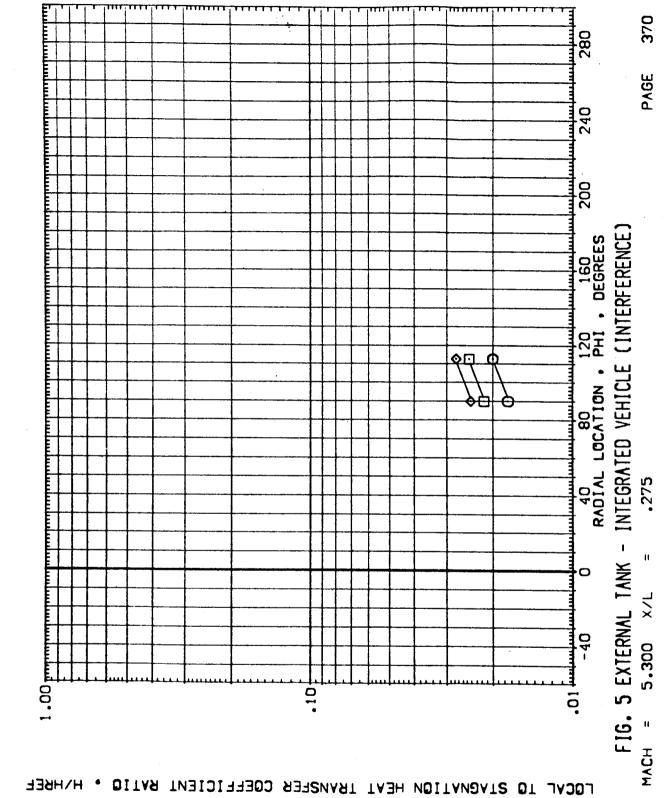
(RE 1103.)

(RE 1103.)





H/YH 0000 0000 0000 0000 ₹ ----888 # \$888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 0ATA SET SYMBO. (RE1103) (AE1103)



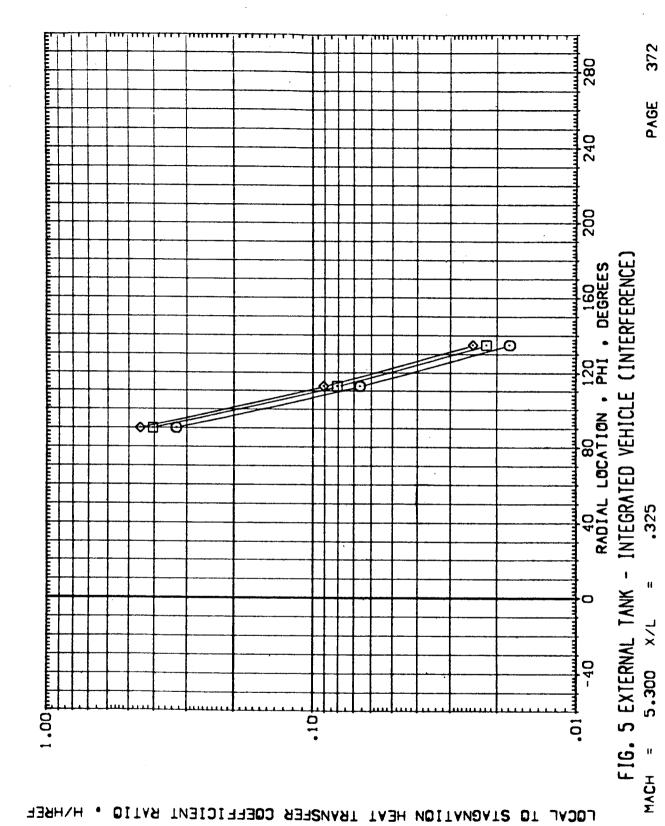


HAN-1888 1888 1888 § ----888 # 888 \$888 ₹ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+\$ (TRIPS) EXTERNAL TANK ARC 3.5-178 IH3 0+1+\$ (TRIPS) EXTERNAL TANK ARC 3.5-178 IH3 0+1+\$ (TRIPS) EXTERNAL TANK DATA SET SYMBO.

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0 Φħ. 200 INTEGRATED VEHICLE (INTERFERENCE) AO 80 120 160 RADIAL LOCATION . PHI . DEGREES FIG. 5 EXTERNAL TANK -1.001 0 FOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

#\#\# 600.69 950.00

888 \$888

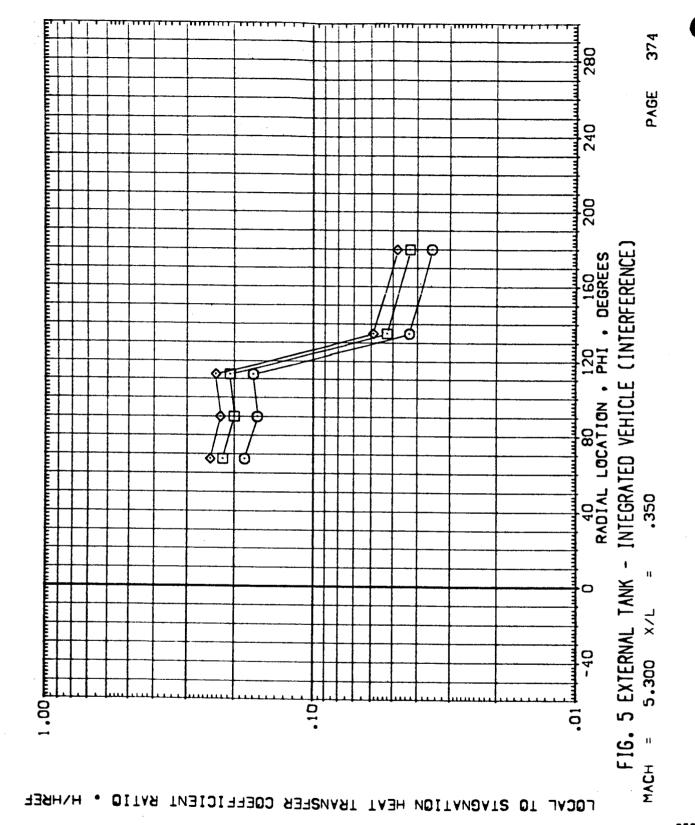
¥ 888 888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS)

DATA #ET SYNEO.

HWH 2000 2000 2000 2000 2000 # 888 \$88 ¥ 888 0+1+5 (TRIPS) | 0+1+5 (TRIPS) | 0+1+5 (TRIPS) | 0+1+5 (TRIPS) | ARC 3.5-178 11 ARC 3.5-178 11 ARC 3.5-178 11 ARC 3.5-178 11 ∞ DATA SET (*RE1103) (*AE1103) (*BE1103)





EXTERNAL TEXTERNAL TEXTERN 0-1-5 (TRIPS) E 0-1-5 (TRIPS) E 0-1-5 (TRIPS) E 0-1-5 (TRIPS) E 1.00 բողուդրուրուրույ ARC 3.5-178 H3 OARC 3.5-178 H3 **§** 0....♦ 0. DATA SET ((RE 1103) (AE 1103) (BE 1103) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF

PAGE 200 INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION . PHI . DEGREES を阻 ঠ FIG. 5 EXTERNAL TANK -5.300

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¥ 888

HVH1 9899 8898 <u>ල</u> **8**년 AT 8888 £ 8888 8888 øф EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK **ब्रे**च वि CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 1.00 يسم DATA SET SYMBD.

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(RE 1703) 01.

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



PAGE

280

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INTEGRATED VEHICLE (INTERFERENCE)

.400

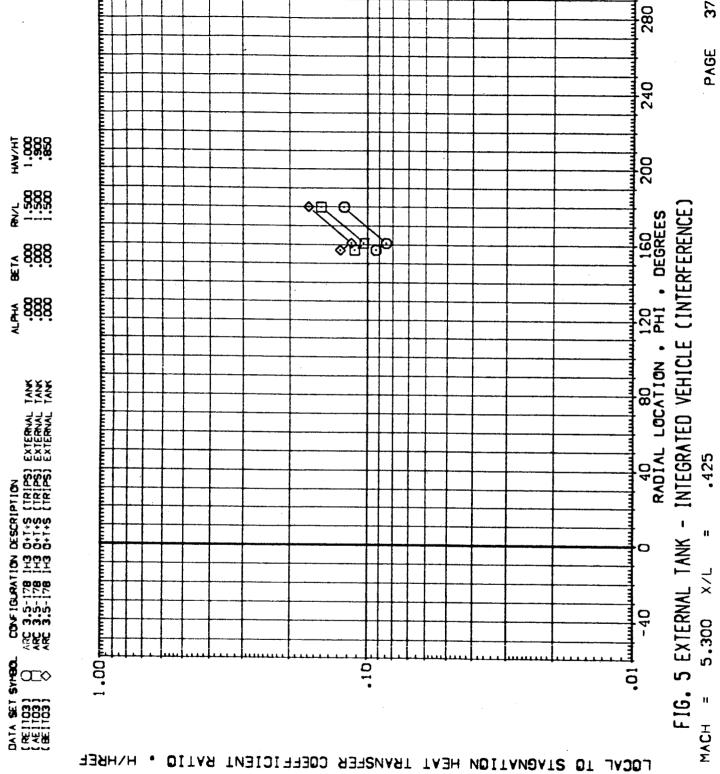
FIG. 5 EXTERNAL TANK -

<u>.</u>

5,300

MACH

40 80 120 160 RADIAL LOCATION . PHI . DEGREES



280 240 1.000 1.000 1.000 1.000 1.000 1.000 200 40 80 120 160 RADIAL LOCATION . PHI . DEGREES # 8666 6666 **VII.** 0 80 ₹ 8886 8886 ळा CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 0 1 • 00 բուդուդրադրադրույ 0ATA SET SYNGO. (AETTGS) (BETTGS) 0: <u>.</u>

FOCYT 10 SIVENYIION HEVI 184NSEER COEFFICIENI BYIIO . HYHREF



378

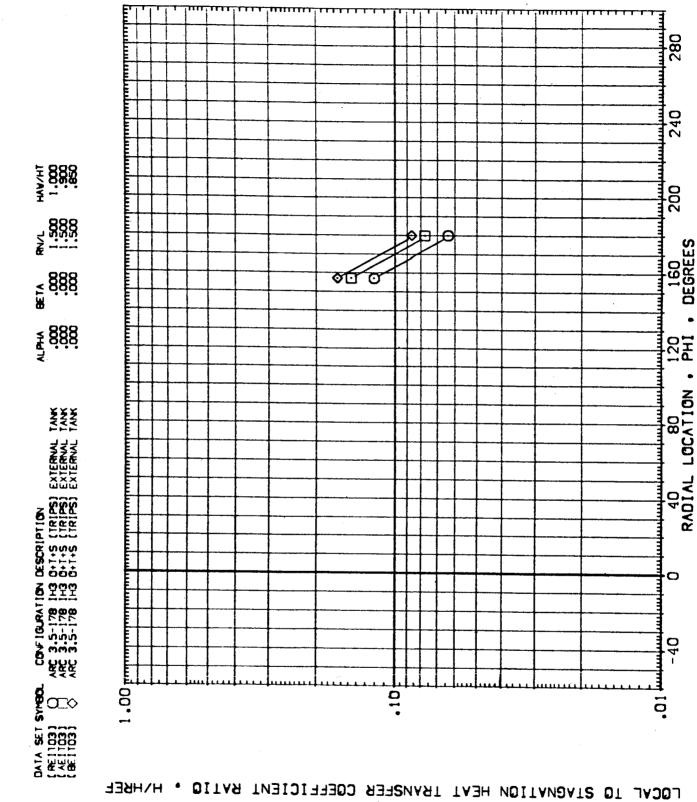
PAGE

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

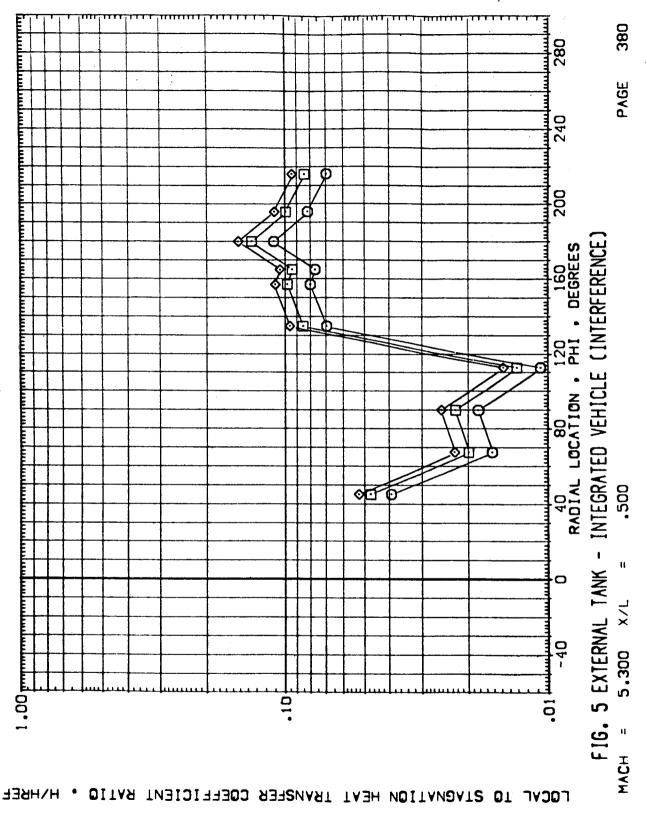
.450

5.300

MACH



#W#1 000.08 000.08 \frac{\frac{1}{2} ---}{888} # 888 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 041+5 (TRIPS) ARC 3.5-178 H3 041+5 (TRIPS) ARC 3.5-178 H3 041+5 (TRIPS) DATA SET SYNBOL (RE 1103) (AE 1103) (BE 1103)





PAGE 200 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION • PHI • DEGREES ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) FIG. 5 EXTERNAL TANK -0 1 .00 բուդուպուպուպուպ 5,300 DATA SET SYNBOL

(RE 1703)

(RE 1703)

(BE 1703) 101 0 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

382 280 PAGE 240 120 INTEGRATED VEHICLE (INTERFERENCE) AD 80 120 160 RADIAL LOCATION . PHI . DEGREES **∞** .550 FIG. 5 EXTERNAL TANK -1 .00 բուդուդուդուդուդու 5,300 101 ö MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF

HV/HI 000.000 000.0000

\$ ----888

A 8888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS)

2474 SET SYNES.



383 PAGE 200 \$ ----888 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION • PHI • DEGREES # ₹ 888 ¥ 888 ŽŽŽŽ ŽŽŽŽ CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) FIG. 5 EXTERNAL TANK -O 1.00 բոպուարադապատ -40 5,300 DATA SET SYNGO. 100 <u>.</u> LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) PATA KET SYNED. (**E1733) SYNED. (**E1733) SYNED. (**E1733) SYNED. (**E1733) SYNED.

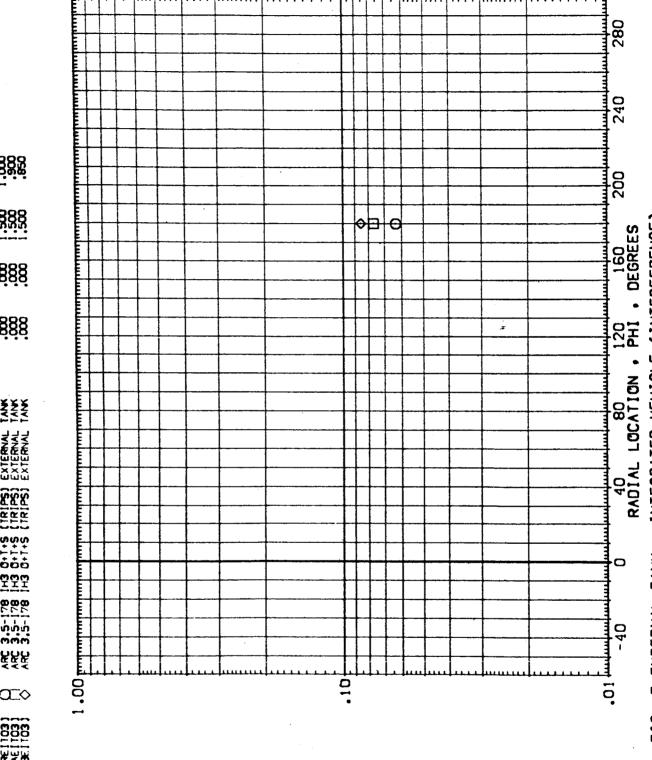
384 280 PAGE 200 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES ØŒ ØЖ .600 Ō ØD FIG. 5 EXTERNAL TANK -× 1 • 00 graymay 5.300 -<u>o</u> MACH

FOCYT 10 STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



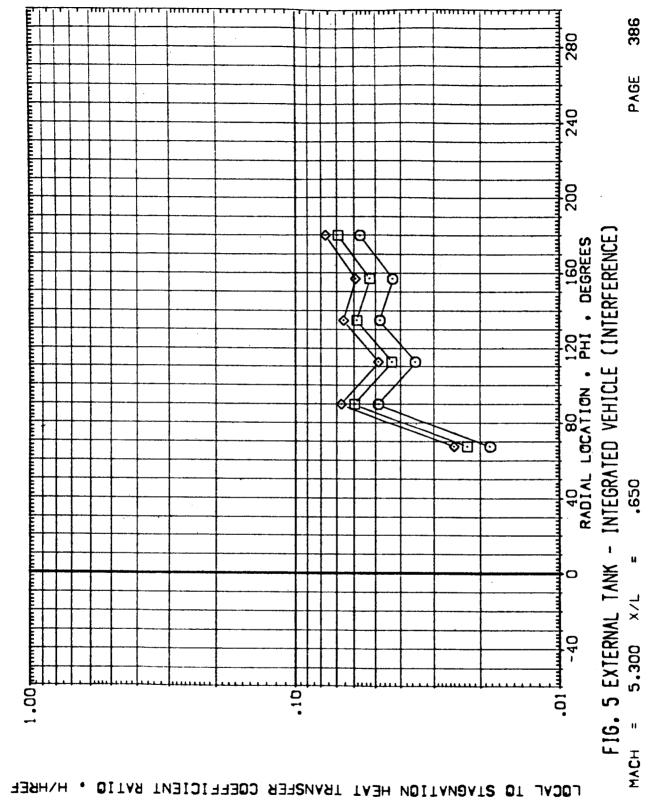
PAGE





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

₹ -6000 10000 ₹ 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E ARC 3.5-178 1H3 G ARC 3.5-178 1H3 G ARC 3.5-178 1H3 G ARC 3.5-178 1H3 G PATA SET SYNGO.
(*RE1103)
(*RE1103)
(*RE1103)



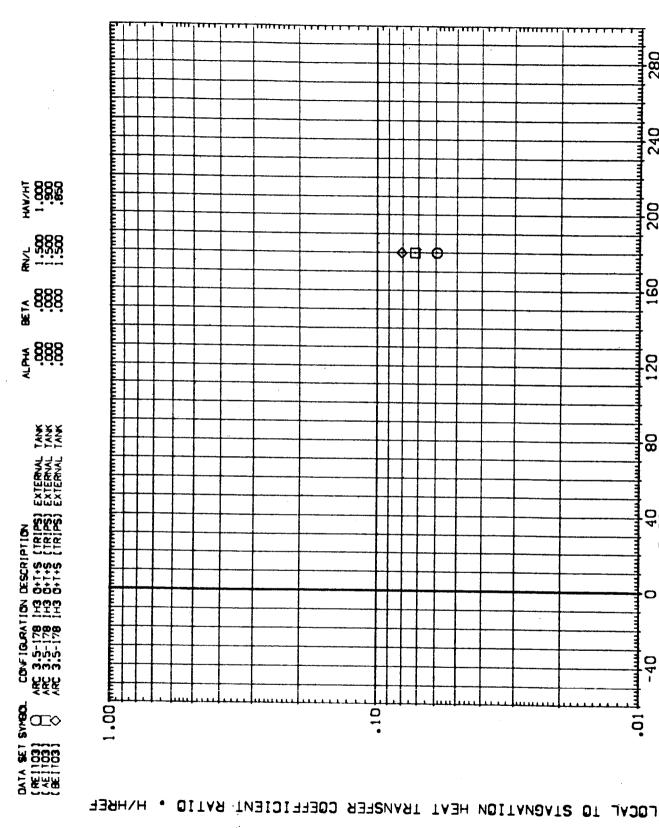


-40

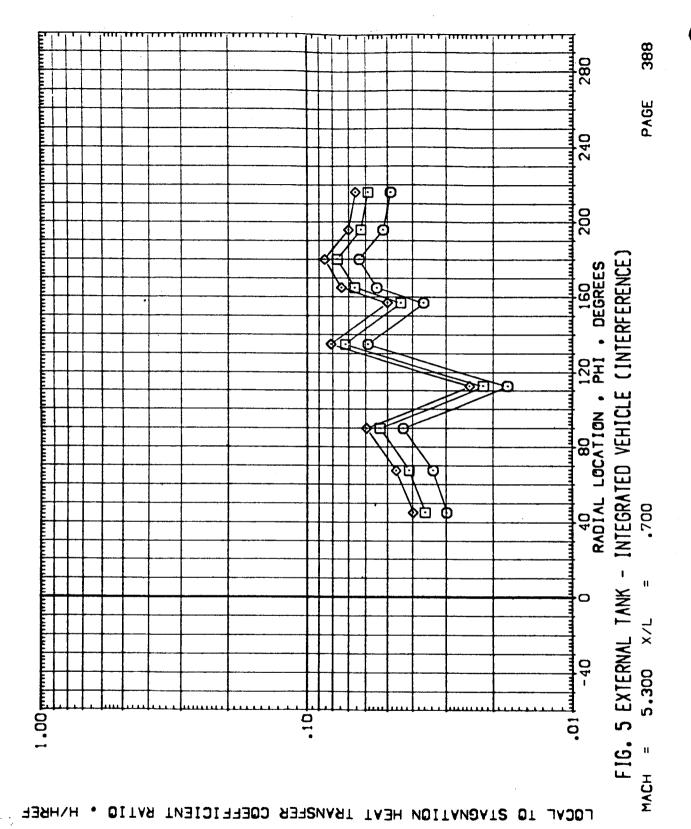
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¥ -8889 1 8889 ¥ 888 (TRIPS) EXTERNAL TANK (TRIPS) EXTERNAL TANK (TRIPS) EXTERNAL TANK ARC 3.5-178 1H3 Q+1+S (ARC 3.5-178 1H3 Q+1+S (ARC 3.5-178 1H3 Q+1+S (ARC 3.5-178 1H3 Q+1+S (

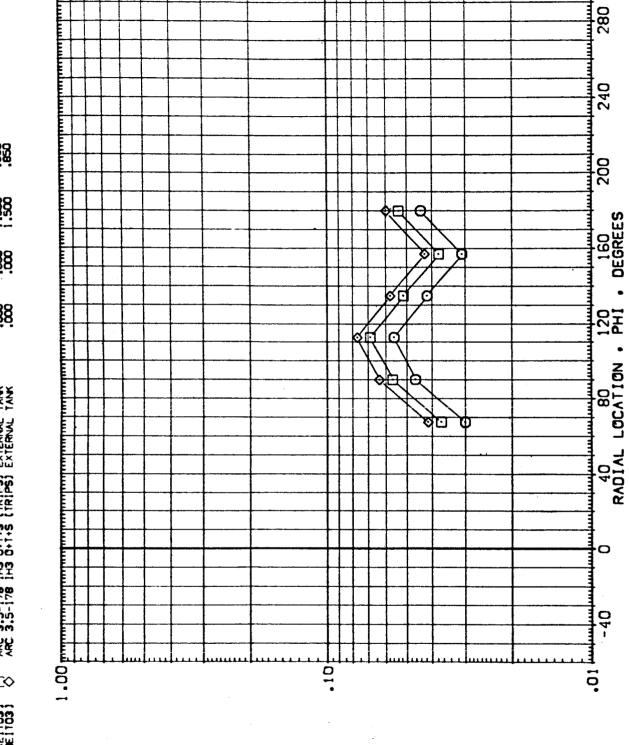




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5,300

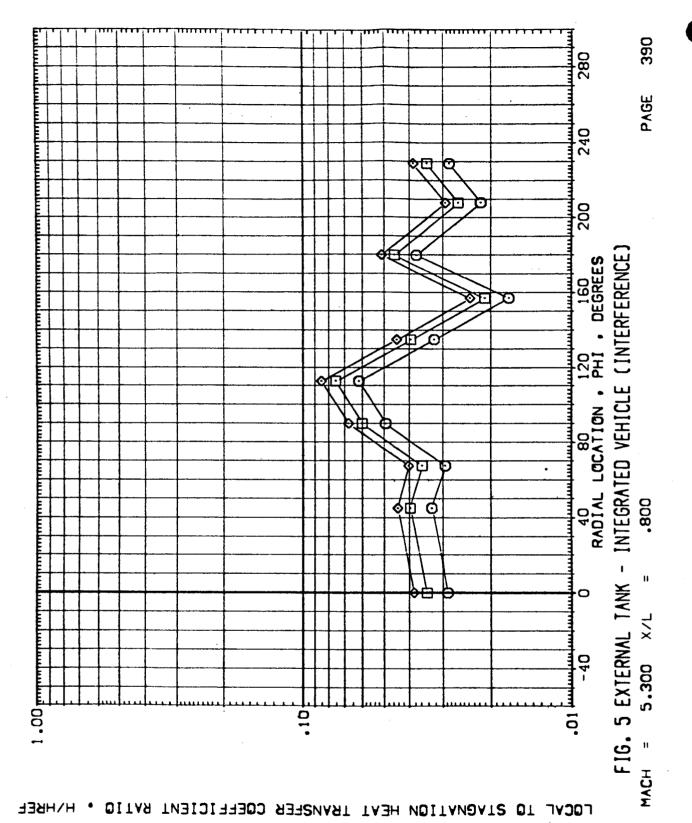




LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

¥ -888 888

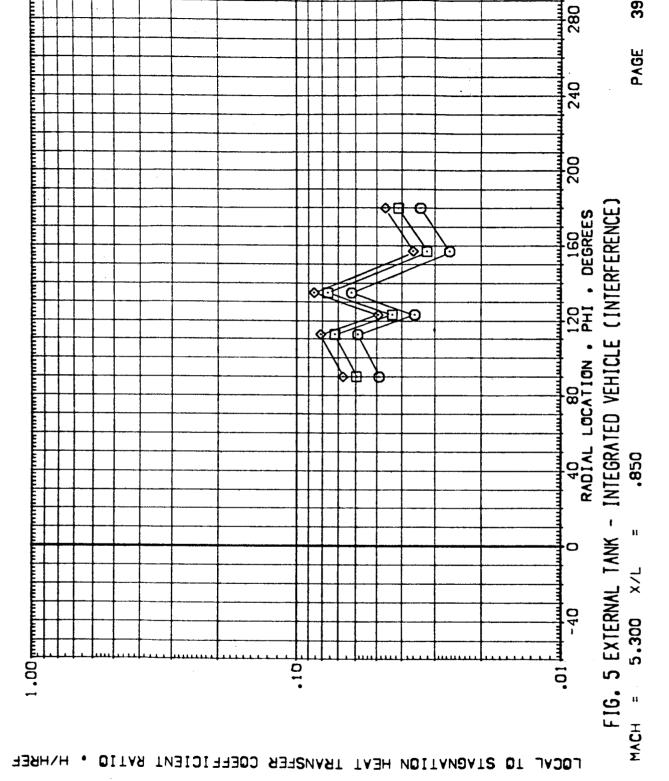
₹ ----888





391 280 PAGE ¥ -8899 5808 INTEGRATED VEHICLE (INTERFERENCE)
.825 A0 80 120 160 RADIAL LOCATION . PHI . DEGREES # 888 ₹ 988 988 **О**П d ¥¥¥ ¥¥¥ EXTERNAL T EXTERNAL T EXTERNAL T CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) FIG. 5 EXTERNAL TANK -1 -00 բողոտրադրարարուդ 5,300 PATA SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/80 CENTRAL SET 34/ 01. 0 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO H\HKEE

8666 8000 ₹ 888 CONFIGURATION DESCRIPTION
ARC 3.5-178 IH3 0+1+5 (TRIPS) EXTERNAL TANK
ARC 3.5-178 IH3 0+1+5 (TRIPS) EXTERNAL TANK
ARC 3.5-178 IH3 0+1+5 (TRIPS) EXTERNAL TANK 0A1A SET SYNBOL (RE 1703) (AE 1703)

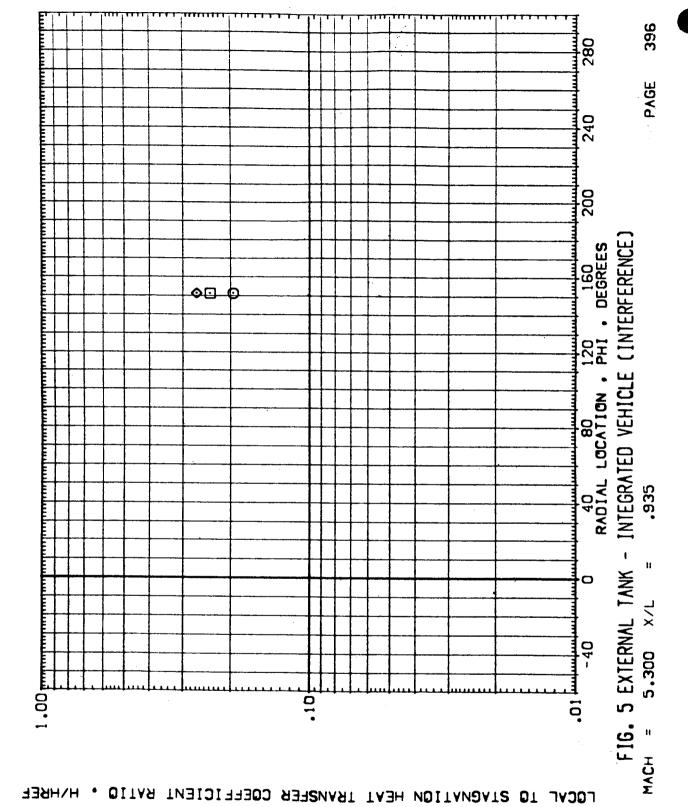




394 280 PAGE 240 ¥ -8999 1 8888 200 INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION . PHI . DEGREES # 888 * 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 900 Ø Q 0+1+8 (TRIPS) E FIG. 5 EXTERNAL TANK ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC ARC 3.5-178 HW GARC 3.5-178 HW GARC ARC 3.5-178 HW GARC 3.5-178 HW -40 5.300 1.00 gramma 101 åœ⊳ <u>.</u> MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF



HAW/H1 0000 0000 0000 0000 0000 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+15 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS)



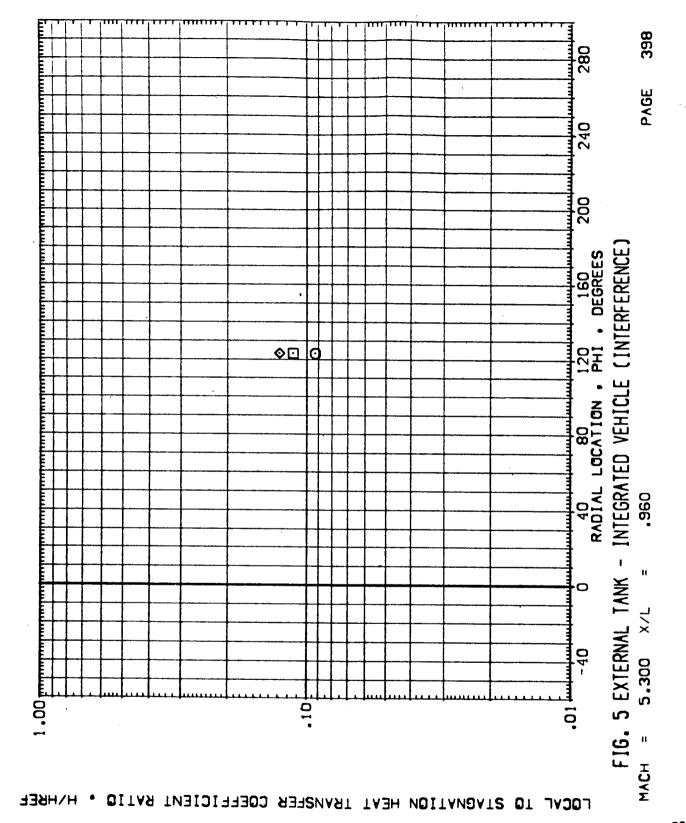


280 PAGE 240 1.000 1.000 9.000 9.000 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES # 888 888 £ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 0 1 • 00 ըստրուպուտրադրապատ -40 0. MACH = LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

¥ -898 1

\$ ----888

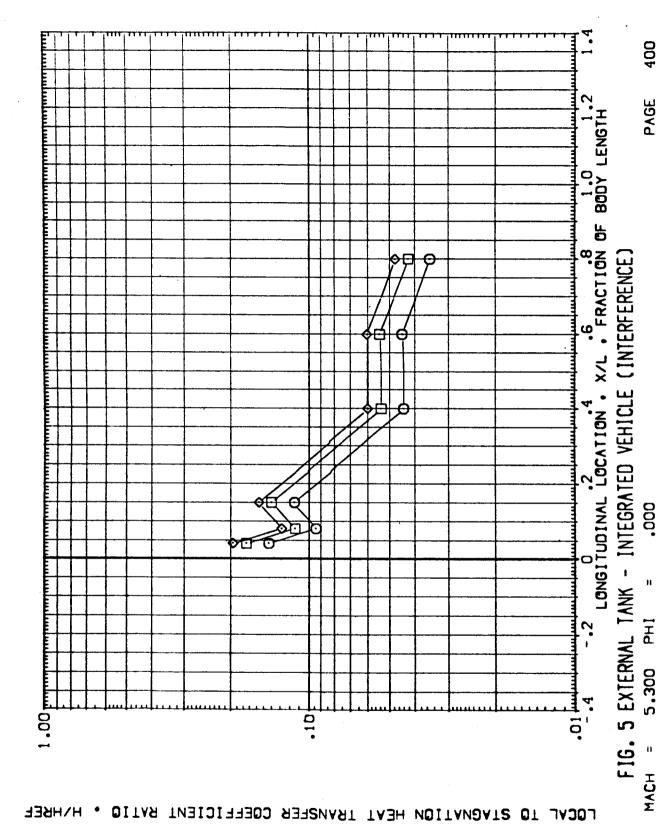
₹ 888



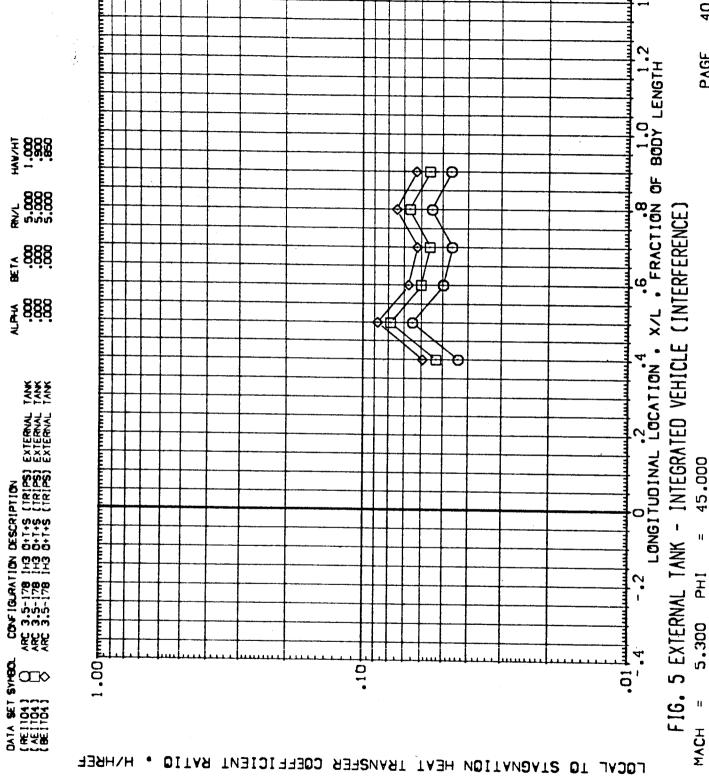


₹ ოოო 1 888 1 888 # \$886 \$886 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) PATA SET SYNED.

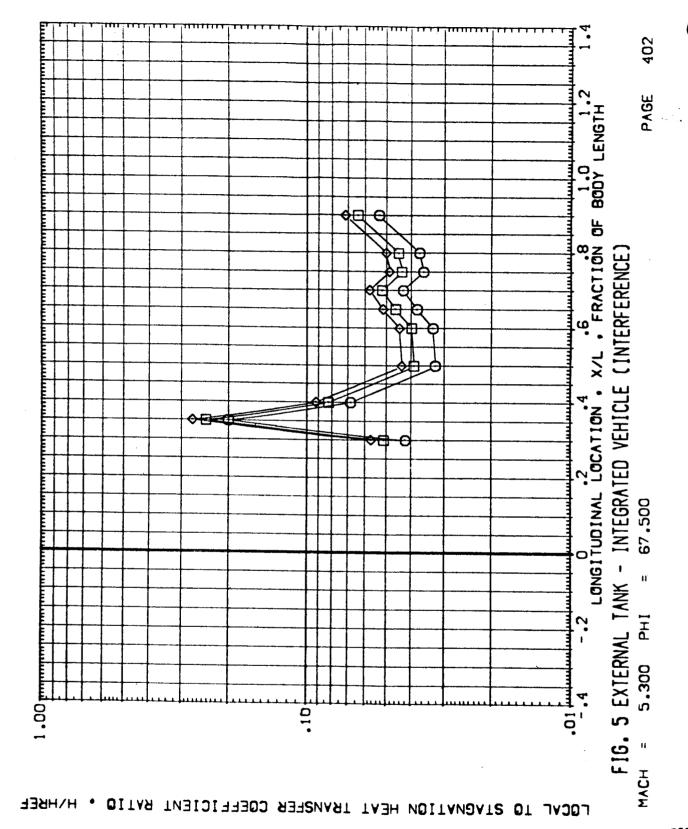
HAW/H 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000



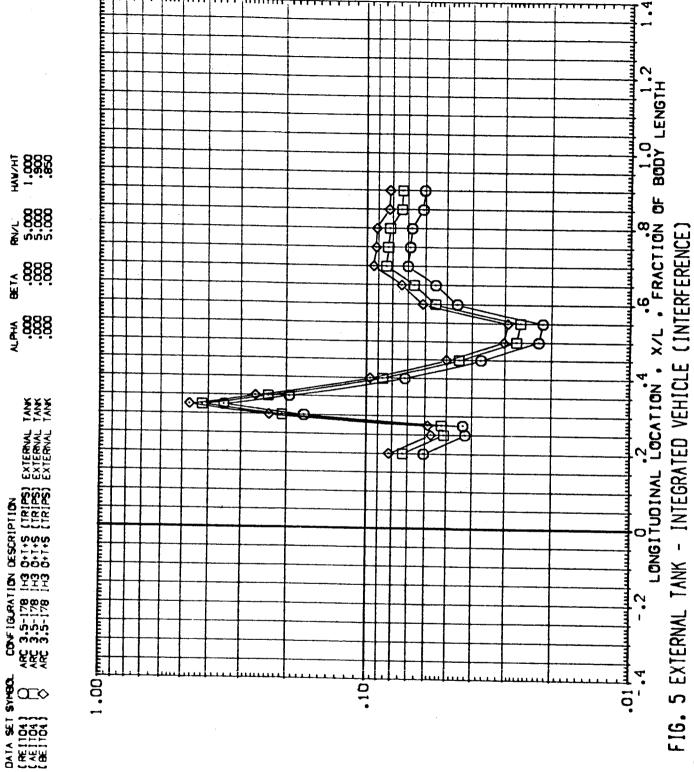




\$ 000 1888 ¥ 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 1100 DESCRIPTION
113 04145 (TRIPS) E
113 04145 (TRIPS) E
113 04145 (TRIPS) E ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | ∞ PATA SET S (RE1104) (AE1104)







90.000

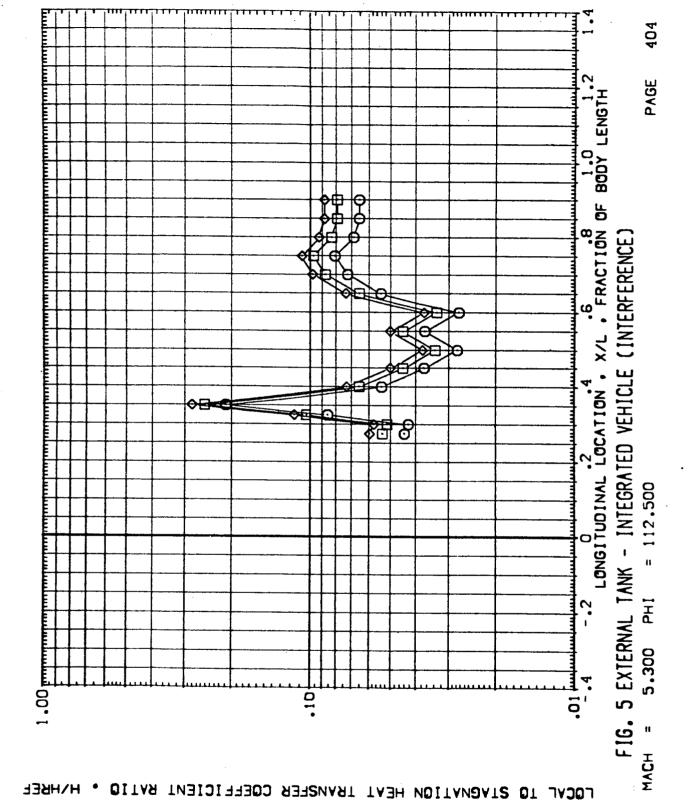
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

₹ ∾∾∾ 988 988 # ₹ 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) PATA ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST. BY ST.

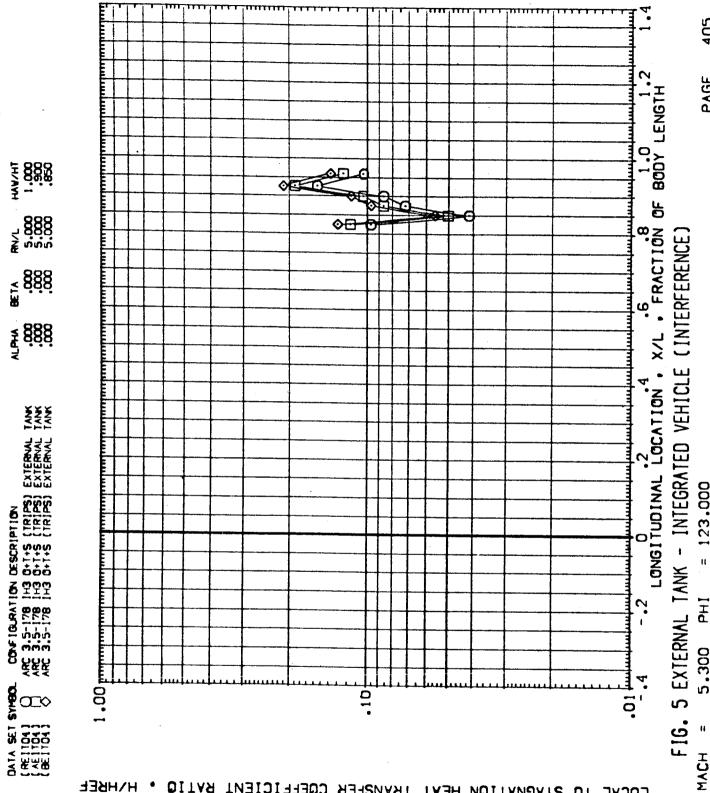




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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO H\HKEE

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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¥ 888

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

0+1+5 (TRIPS) E 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E DESCRIPTION

ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 D

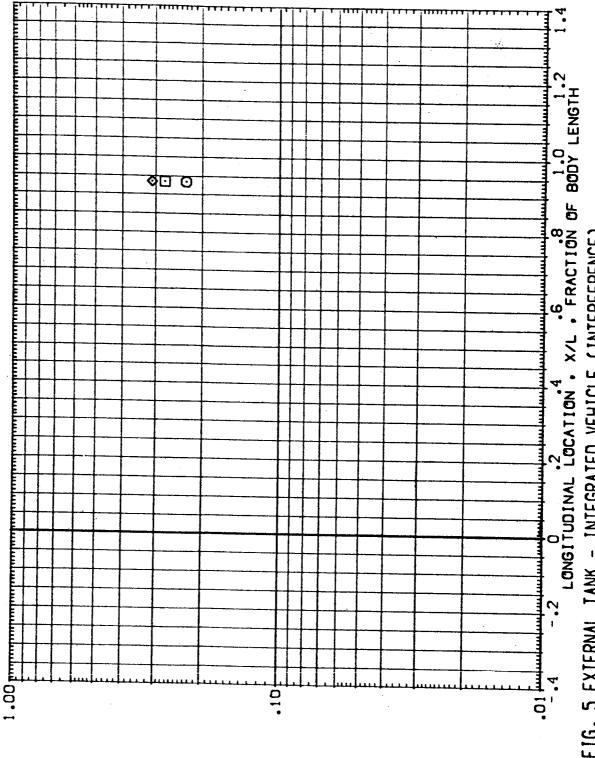
DATA SET SYNGO.



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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) ₹ 888 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 1.00 grupun 0. 1. 10

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF



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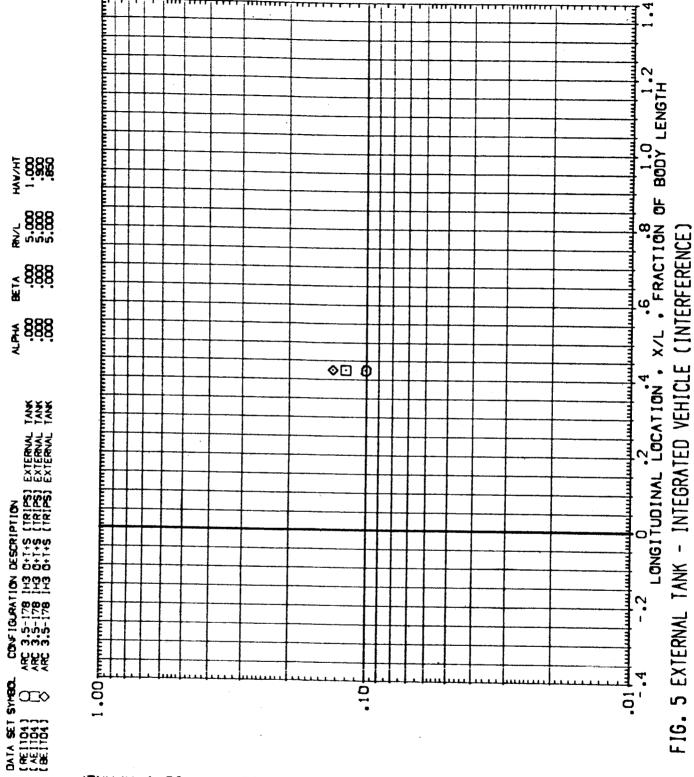
5,300

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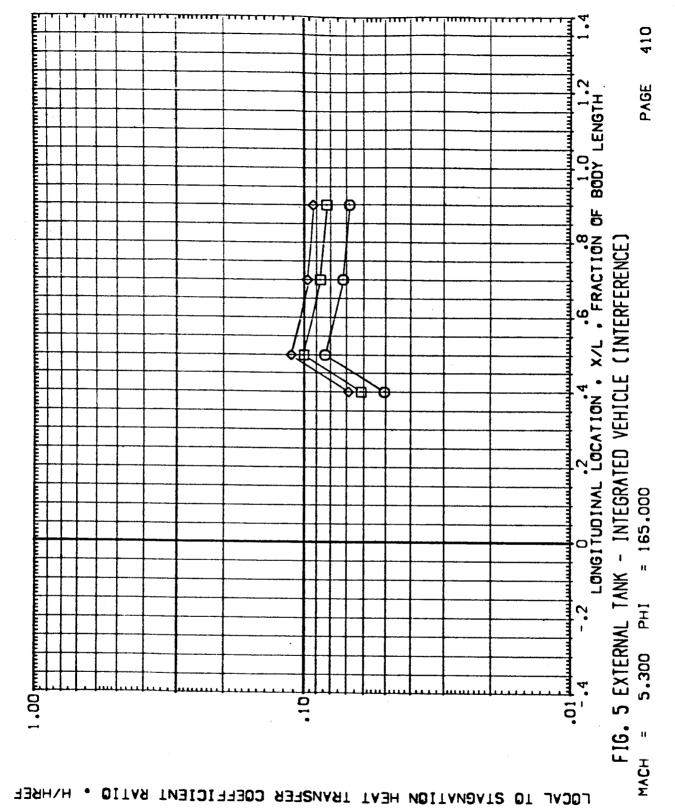
5,300



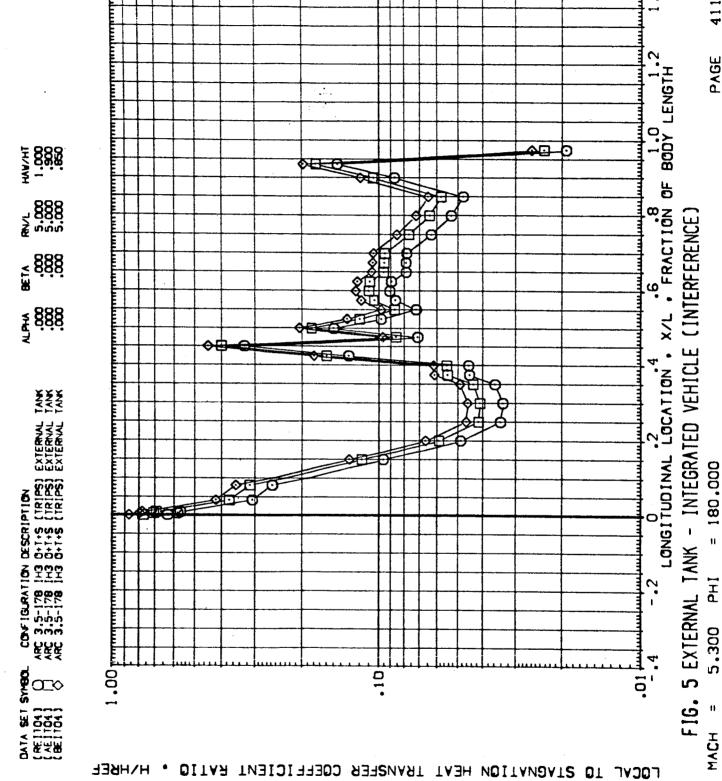
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ -8008 0008 ₹ www 8666 8666 # 8889 ¥ 888 110N DESCRIPTION
1143 041+5 (TRIPS) E
1143 041+5 (TRIPS) E
1143 041+5 (TRIPS) E ARC 3.5-178 19 ARC 3.5-178 19 ARC 3.5-178 19 ARC 3.5-178 19 PATA SET SYNGO.



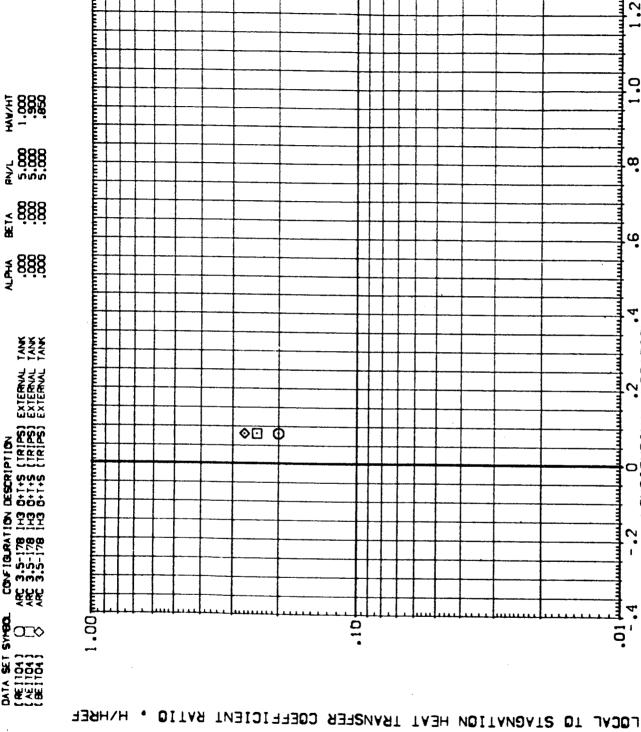






EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK # DESCRIPTION | 0+1+5 (TRIPS) E | 0+1+5 (TRIPS) E | 0+1+5 (TRIPS) E | 0+1+5 (TRIPS) E CONFIGURATION ARC 3.5-178 19 ARC 3.5-178 19 ARC 3.5-178 19 ARC 3.5-178 19 DATA SET SYNBO.









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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ \$888 CONFIGURATION DESCRIPTION
ARC 3.5-178 H3 0+1+S (TRIPS) EXTERNAL TANK
DATA NOT AVAILABLE
ARC 3.5-178 H3 0+1+S (TRIPS) EXTERNAL TANK DATA SET SYNBOL (RE1104)

¥ -888 888 ₹ ∾∾∾ 988 988 # 888

BODY LENGTH LONGITUDINAL LOCATION . X/L . FRACTION OF FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 1 .00 ըսպուպուպ 10. 101

10 STAGNATION HEAT TRANSFER COEFFICIENT RATIO



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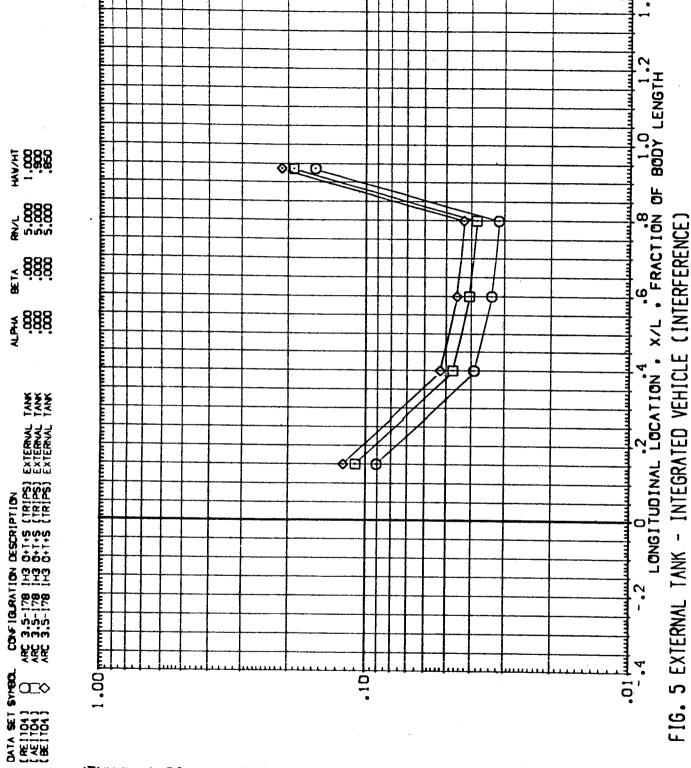
5.300

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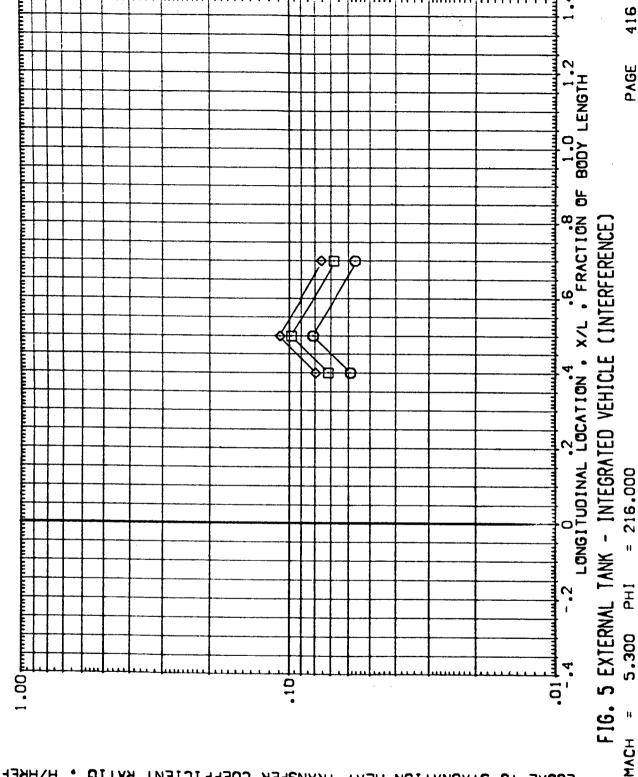
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= 208,000

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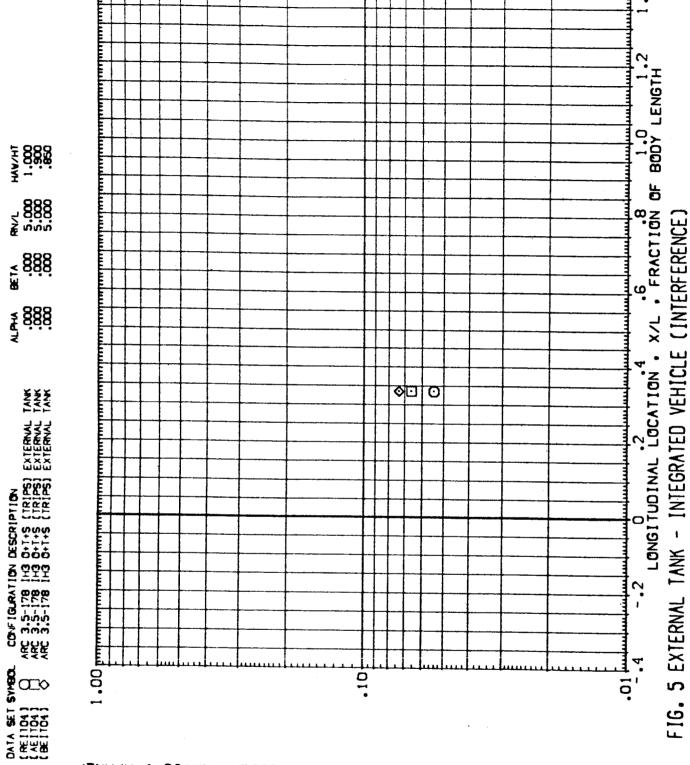
416

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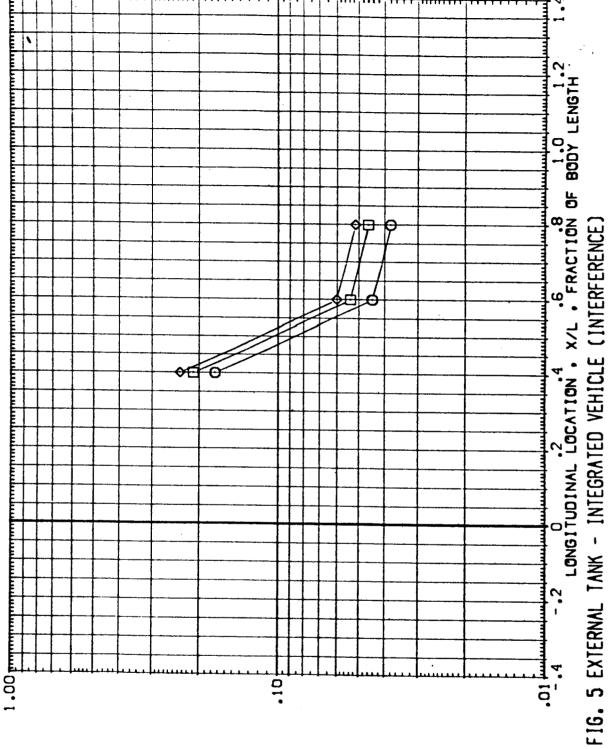
= 222.500

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5.300



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF



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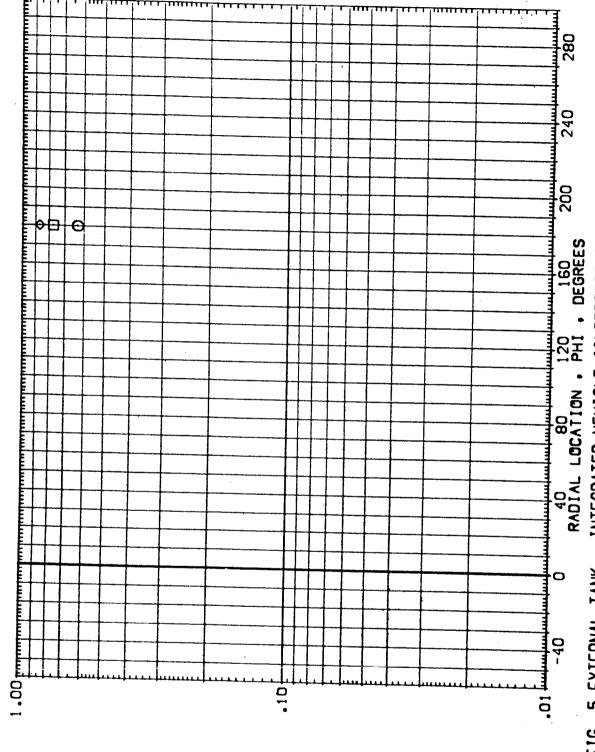
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5,300

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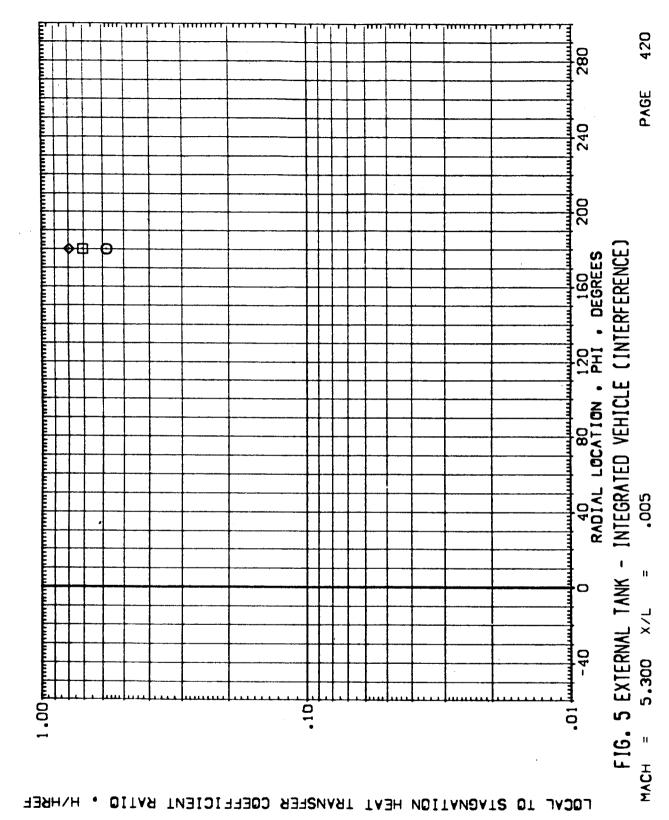
PAGE





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

H/H/H 6008 \$ www 988 ₹ 888 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E COVE IGURATION D RC 3.5-178 1H3 G RC 3.5-178 1H3 G RC 3.5-178 1H3 G ARC 3.5-178 | ARC 3.5-178 | ARC 3.5-178 | 9ATA SET SYNEO.

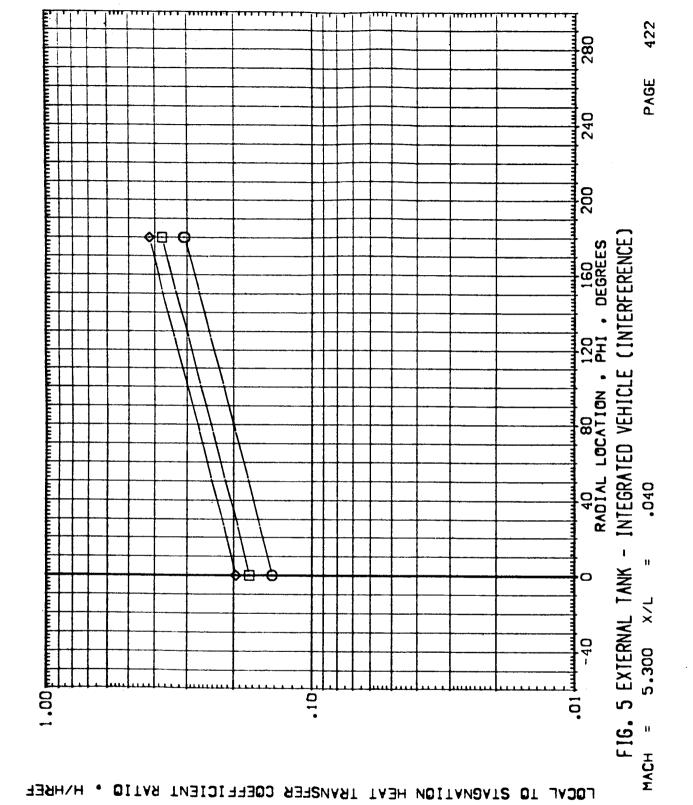




421 200 De Ю INTEGRATED VEHICLE (INTERFERENCE) AD 80 120 160 RADIAL LOCATION . PHI . DEGREES ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) FIG. 5 EXTERNAL TANK -5,300 PATA SET SYNBOA (AE 1704) 100 0. LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

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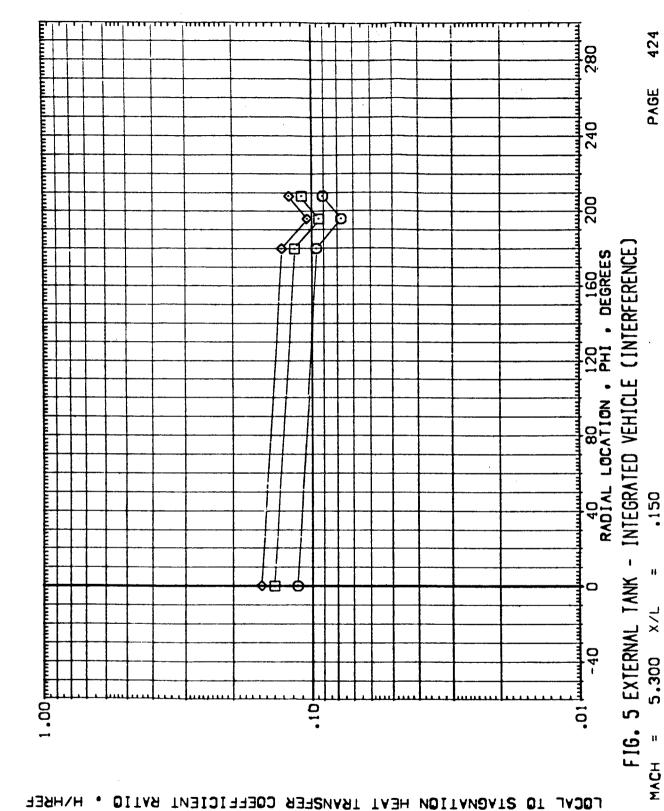
\$ 0000 \$888 \$888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) DATA SET SYNBO.



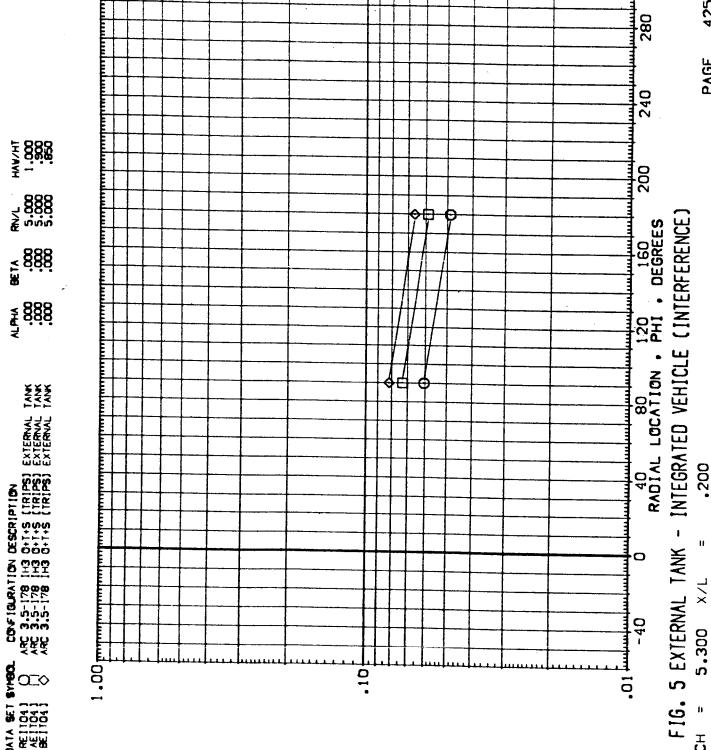


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

#¥. 9899 1800 %.00° 000° 0000 0000 0000 ₹ 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E 0+1+5 (TRIPS) E ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 **§** 000 OATA SET 9 (RE 1104) (AE 1104) (BE 1104)







LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HYHREF

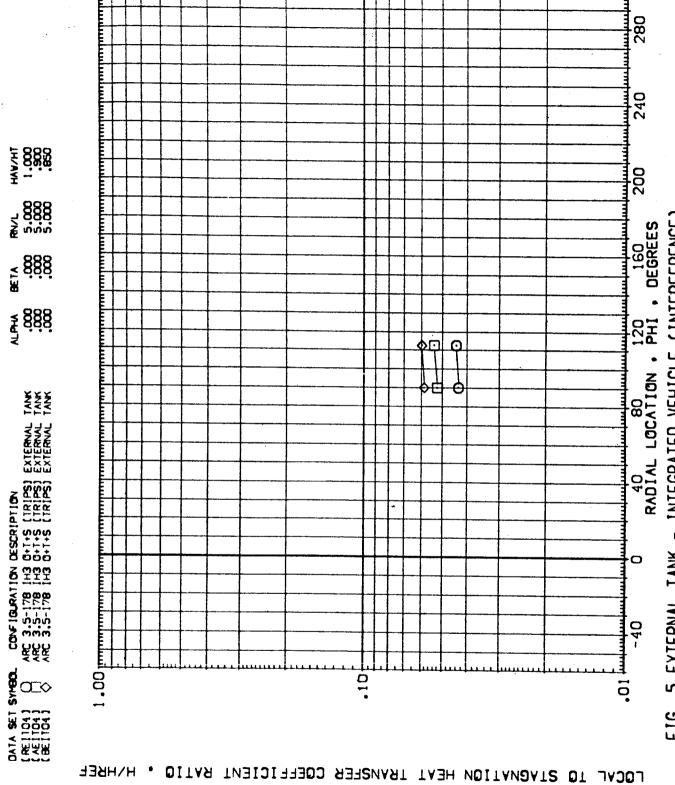
426 280 PAGE 200 § www 9889 INTEGRATED VEHICLE (INTERFERENCE) AO 80 120 160 160 RADIAL LOCATION . PHI . DEGREES ₹ 888 888 ¥ 888 CONFIGURATION DESCRIPTION
ARC 3.5-178 1+3 0+1+5 (TRIPS) EXTERNAL
ARC 3.5-178 1+3 0+1+5 (TRIPS) EXTERNAL
ARC 3.5-178 1+3 0+1+5 (TRIPS) EXTERNAL .250 FIG. 5 EXTERNAL TANK -1.00 քաղոտրարար -49 -40 5.300 **三** 三 DATA #ET 57/80 | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE | STATE 10

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAMREF

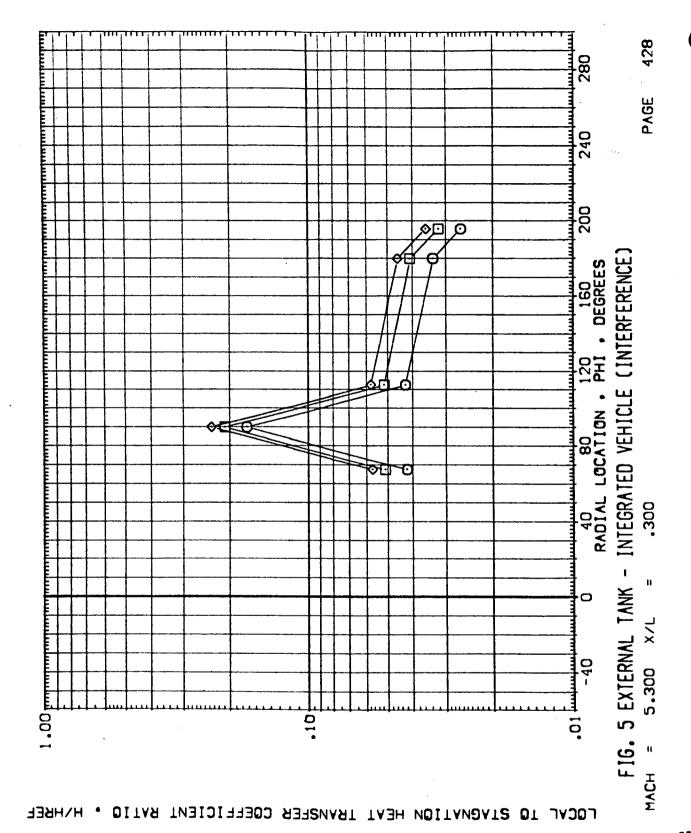


FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 5.300 ×/L MACH =

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± 888. € 888. ₹ 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS)





429 280 PAGE 200 ₹ 888 888 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES A 2000 5000 5000 ¥ 888 **Q**O EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 0+1+S (TRIPS) E (0+1+S (TRIPS) E (0+1+S (TRIPS) E (0+1+S (TRIPS) E (0+1+S (TRIPS) E ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 × \ 5.300 1.00 jmm PATA SET SYNBO.
[RE1704]
[AE1704]
[BE1704] 101 0. MACH = LOCAL TO STAGNATION HEAT TRANSFER COFFFICIENT RATIO . HAHREF

¥ ... 8899 EXTERNAL T EXTERNAL T EXTERNAL T CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 1 • 00 բոպոտրոպուտրութու **§** 000 DATA SET (RE1104) (AE1104) (BE1104)

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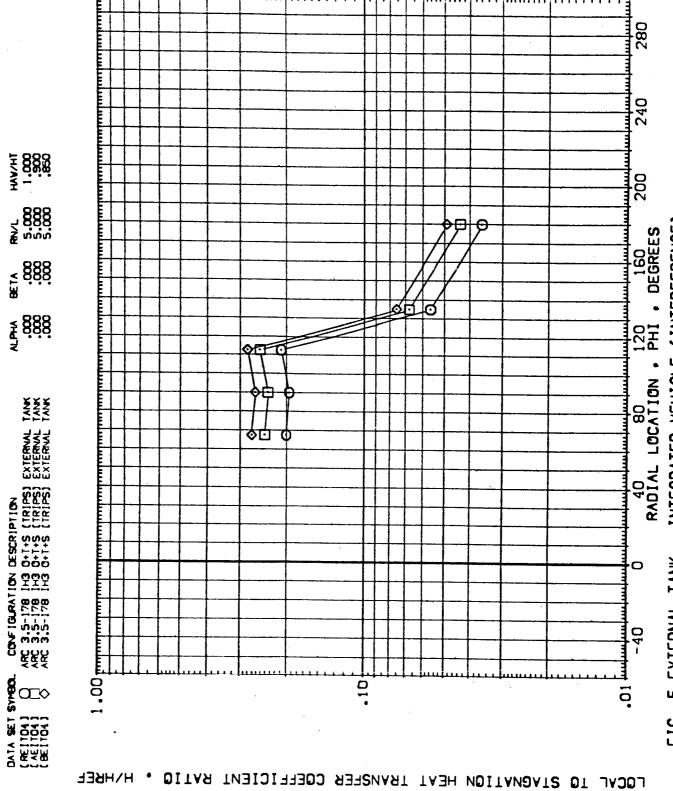
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200

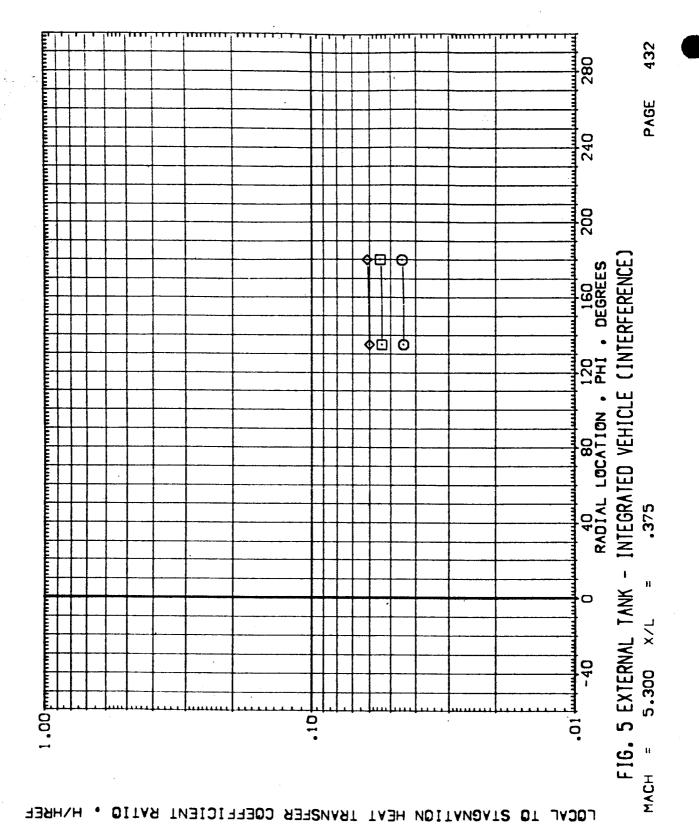
40 80 120 160 RADIAL LOCATION • PHI • DEGREES

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¥ -8888 1488 # 888 ¥ 888 CONFIGURATION DESCRIPTION
ARC 3.5-178 IH3 0+1+\$ (TRIPS) EXTERNAL TANK
ARC 3.5-178 IH3 0+1+\$ (TRIPS) EXTERNAL TANK
ARC 3.5-178 IH3 0+1+\$ (TRIPS) EXTERNAL TANK 0ATA SET SYNBQ. (*E1104) (*E1104)





INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION . PHI . DEGREES Ø र्विए .400 Q FIG. S EXTERNAL TANK --49 -49 5.300 . 10. 101 MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

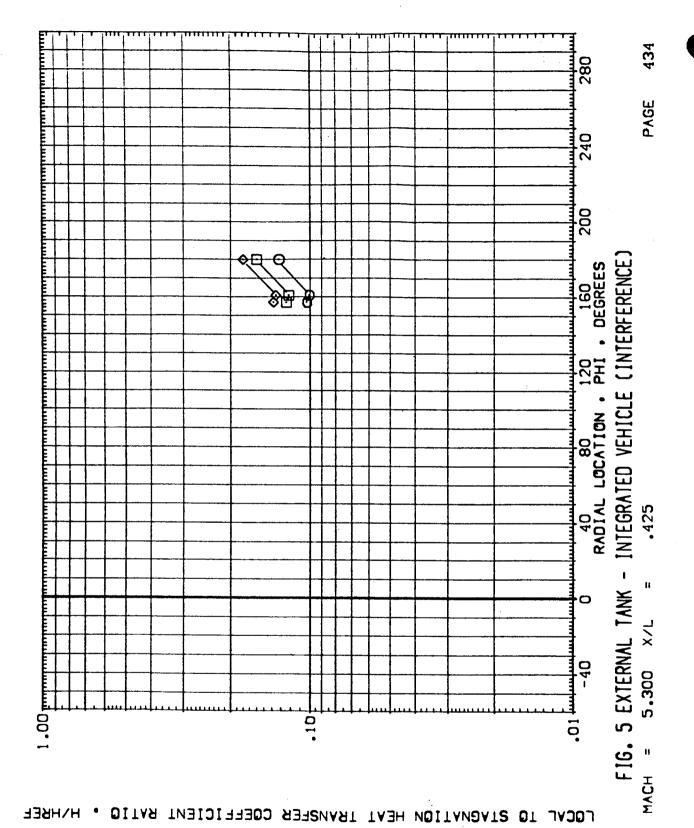
₹ ოოო 9889 988 # 888 888 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 20508 PT 10N 00145 (TR 195) E 00145 (TR 195) E 00145 (TR 195) E ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 9A1A SET SYNBOL 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1 A SET 1945 1

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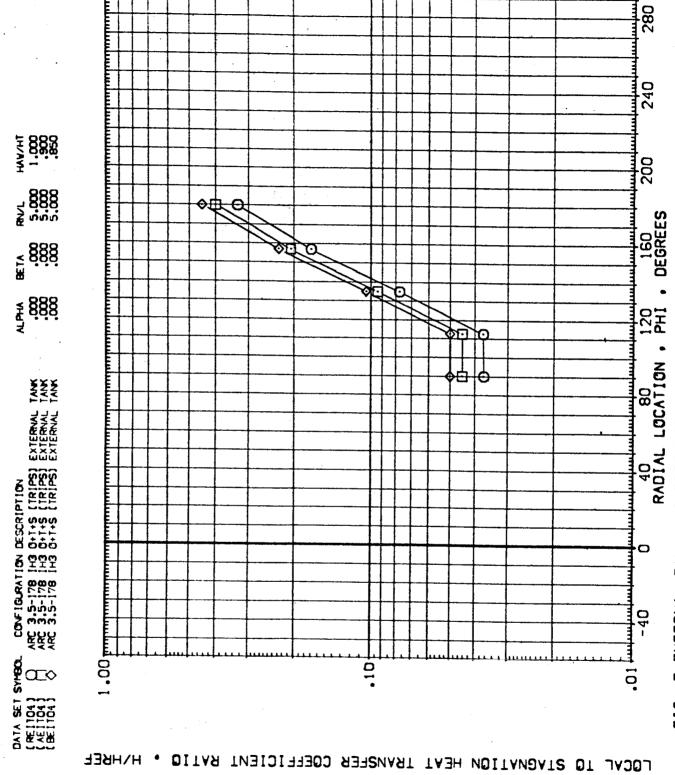
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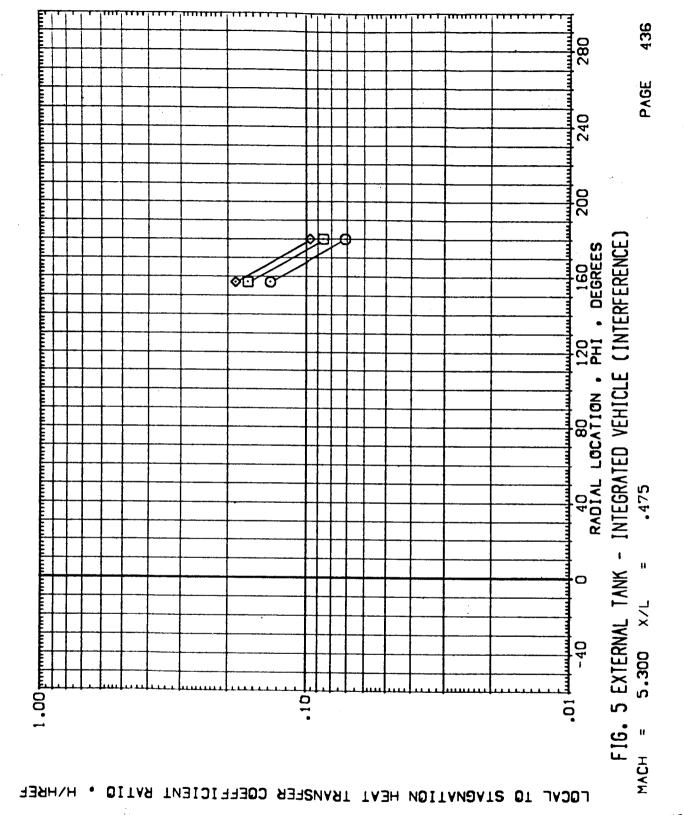
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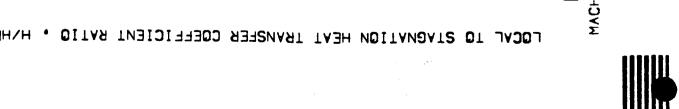
4 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) DATA SET SYNBOL (RE1104) (AE1104)

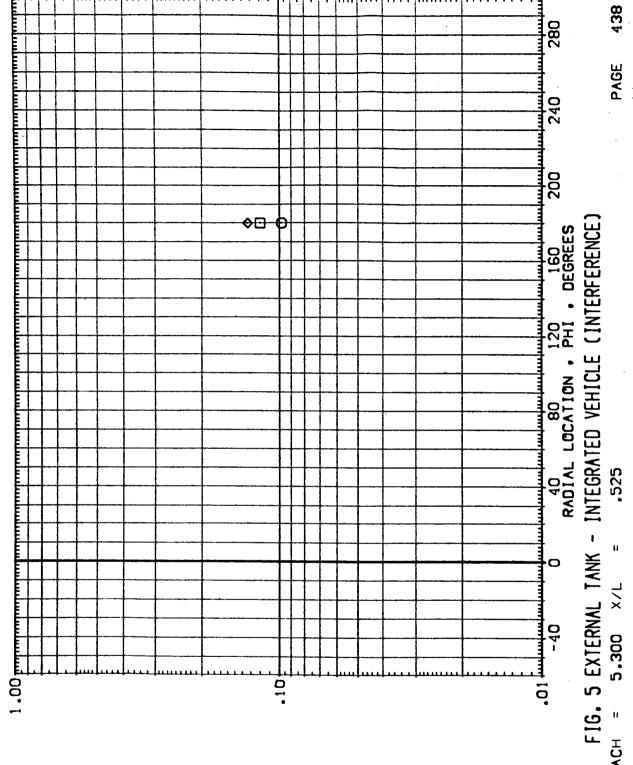




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ARC 3.5-178 IH3 0+1+5 (TRIPS) EXTERNAL TANK
ARC 3.5-178 IH3 0+1+5 (TRIPS) EXTERNAL TANK 00 FIG. 5 EXTERNAL TANK -5,300 ×/L 1.00 mmmm DATA SET SYMBOL.
(RE11041) 10 0 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

H/YH 9869 9869 ₹ \$888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) DATA SET SYMBOL (ME1104)

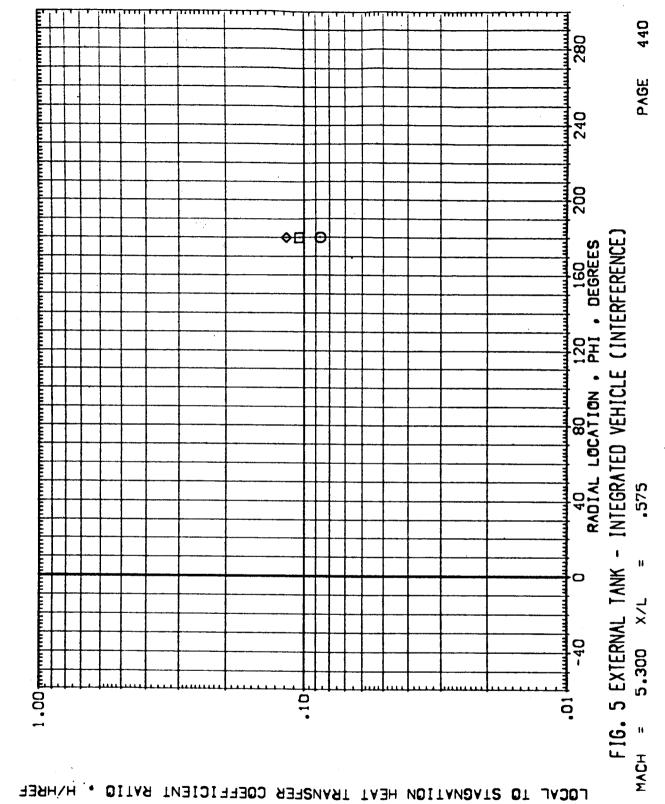






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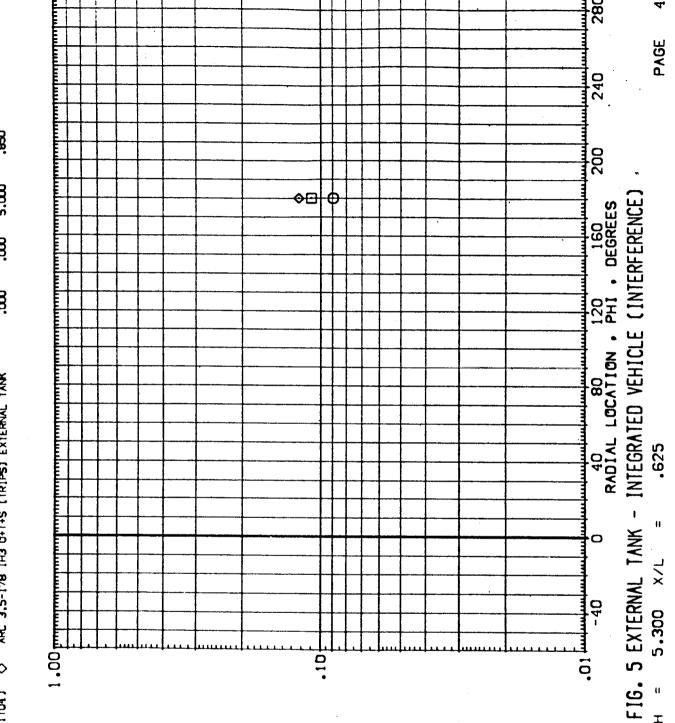
1.000 9.000 9.000 ₹ ∾∾∾ 988 888 # **888** ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) PATA SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100 SET 100





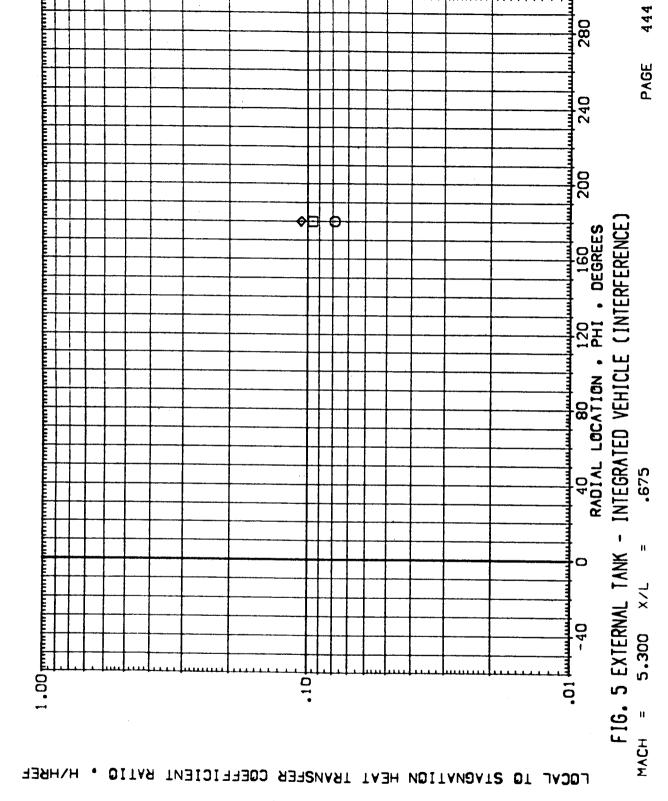
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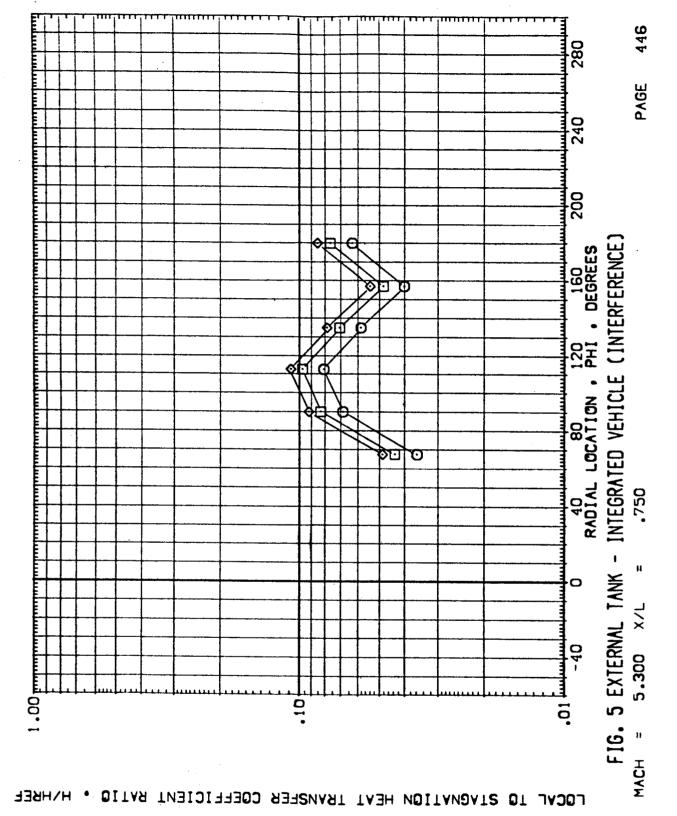
<u>ች</u> ∾∾∾ - 888 # ₹ 888 888 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) ARC 3.5-178 1H3 0+1+5 (TRIPS) 0ATA SET SYMBO. (RE1104) (AE1104) (BE1104)





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(AE1104)
(AE1104)
(BE1104) 0. LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ 888 4 888 888 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 0ATA SET SYNBOL (RE1104) (AE1104)





280 #X+1 800.86 800.86 200 \$ 0.00 \$886 \$888 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES ₹ 888 888 ळि छ ₹ 888 ¥ EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK ्रे⊡ ⊘⊡ 0 0.145 (TRIPS) E 0.145 (TRIPS) E 0.145 (TRIPS) E 0.145 (TRIPS) E FIG. 5 EXTERNAL TANK -**5** 223 ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF DATA SET SYMBO. (**E1704) (**E1704) 1.001 . 10 <u>.</u>

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

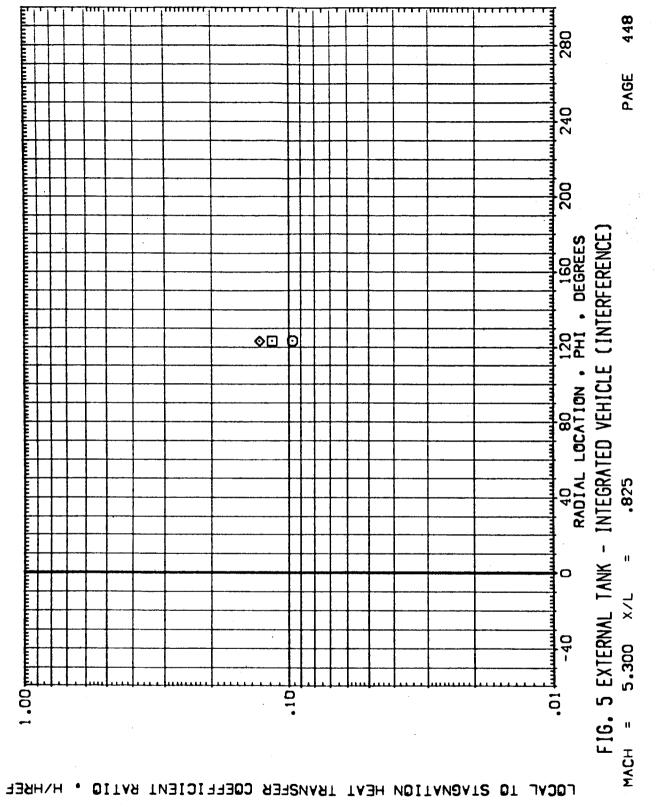
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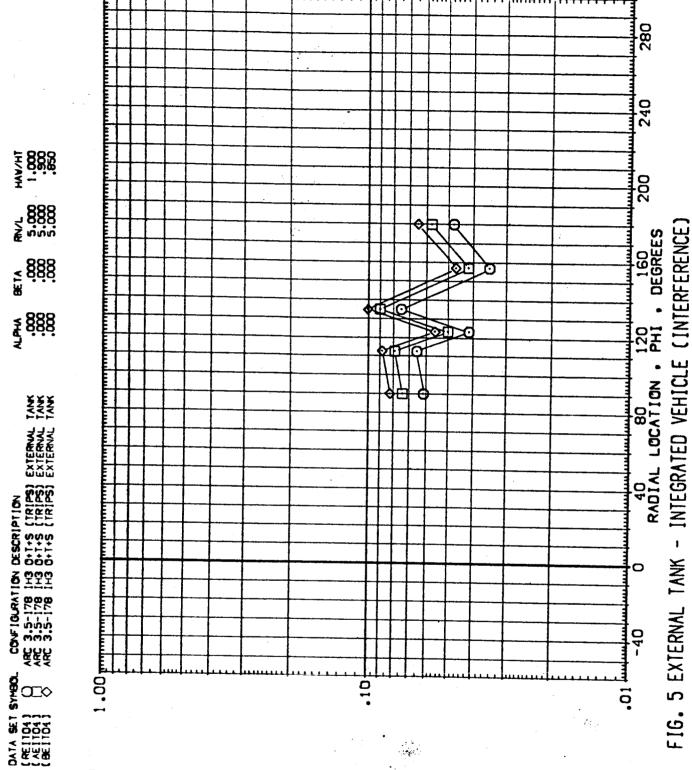


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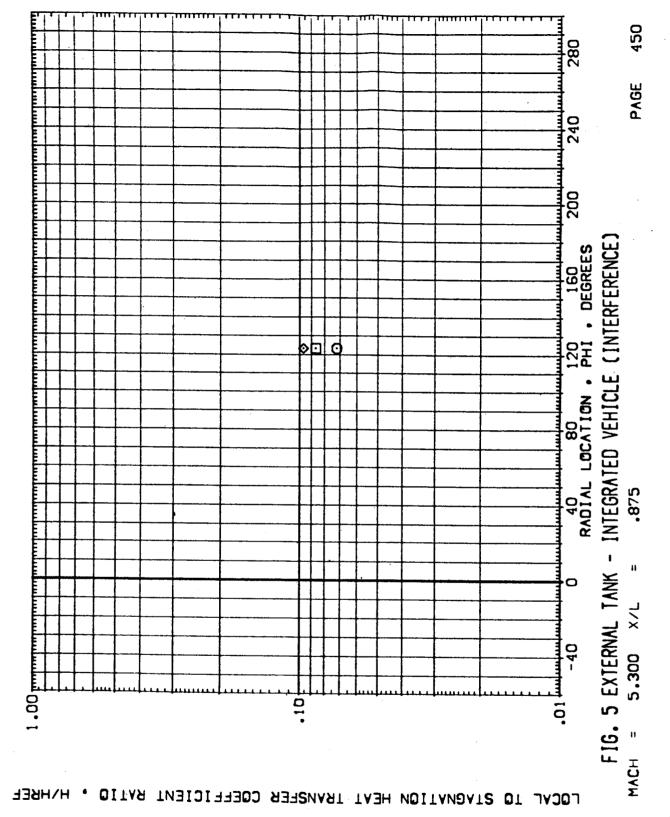
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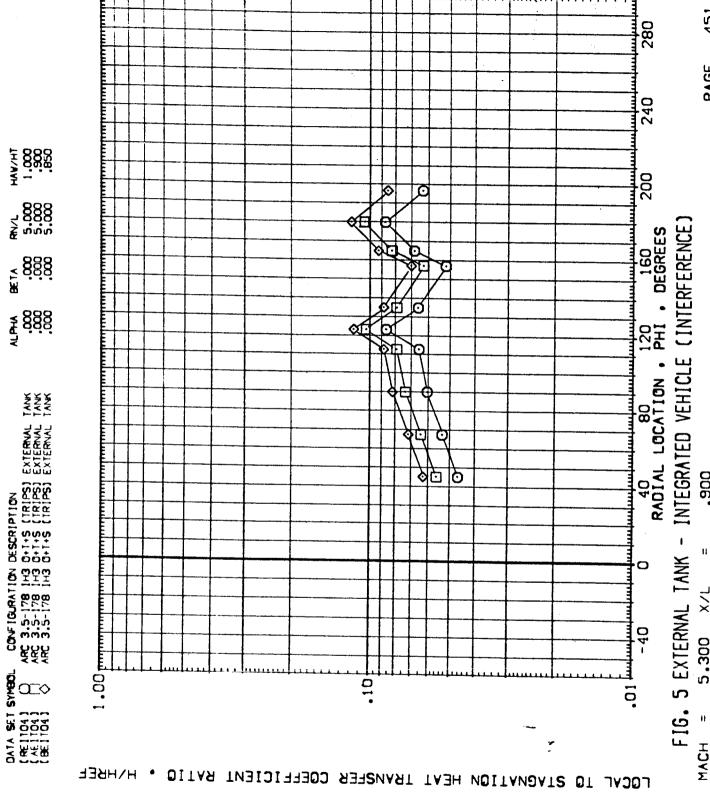


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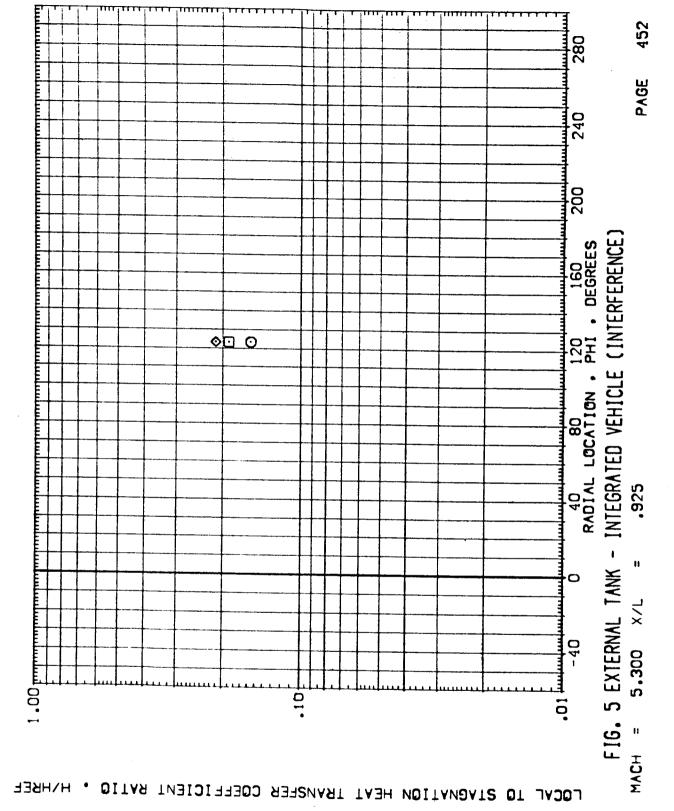






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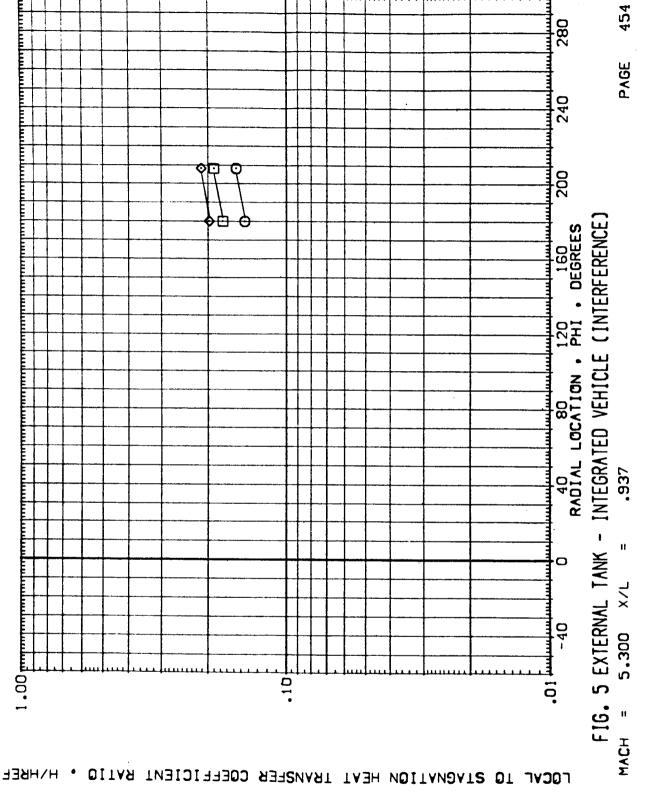






PAGE H/W/H 000.98 200 INTEGRATED VEHICLE (INTERFERENCE) ADIAL LOCATION . PHI . DEGREES **♦⊡ ⊙** ₹ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) ARC 3.5-178 H3 0+1+5 (TRIPS) FIG. 5 EXTERNAL TANK -O 1 .00 բոպոտրարադ -40 5.300 0ATA SET SYNBQ. (AE 1704) (BE 1704) (BE 1704) .10 0 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER

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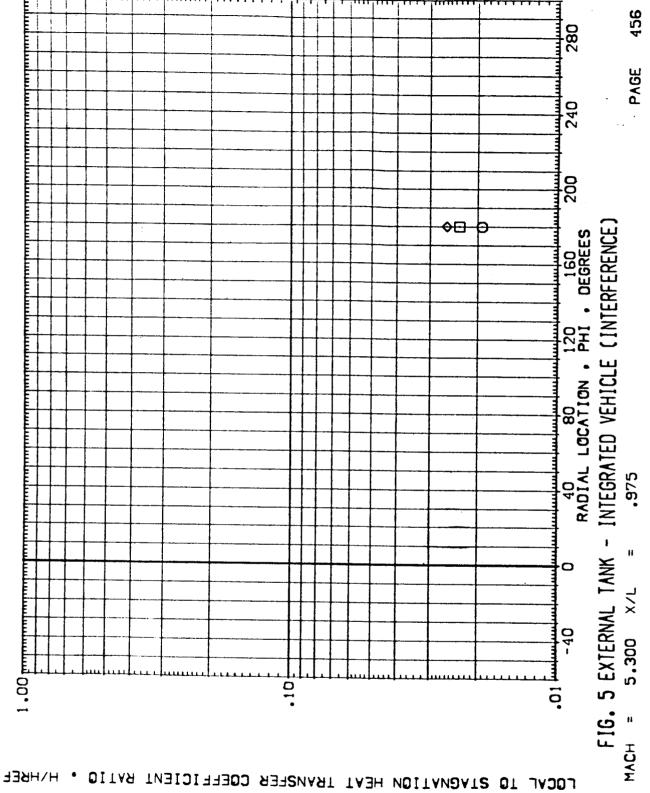




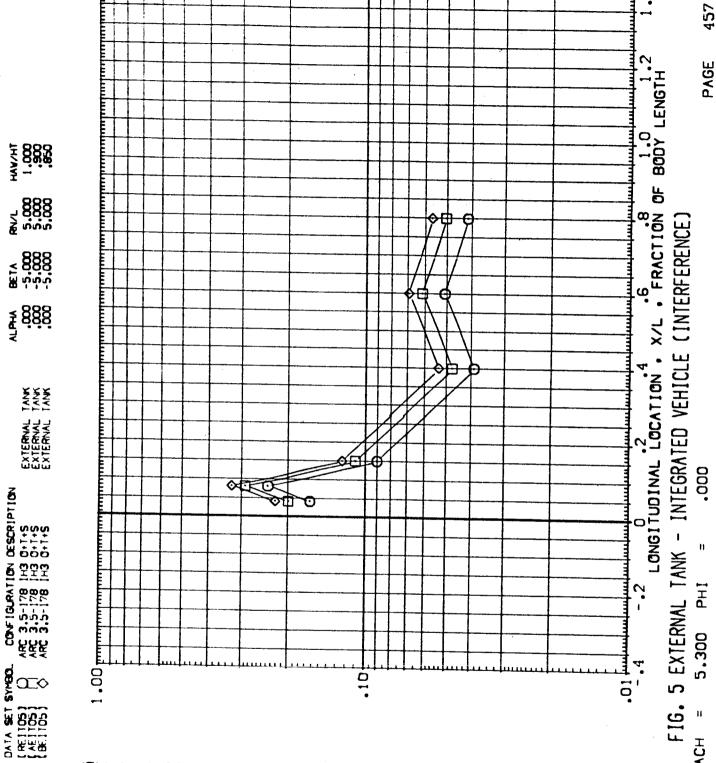


1 •00 բողուդրուդուդուդ

1.000 1.000 900 850 # 8666 8666 4 8866 8866 EXTERNAL TANK
EXTERNAL TANK
EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) ARC 3.5-178 IH3 0+1+5 (TRIPS) 0A1A SET SYMBQ. (RE11041) (AE11041) (BE11041)

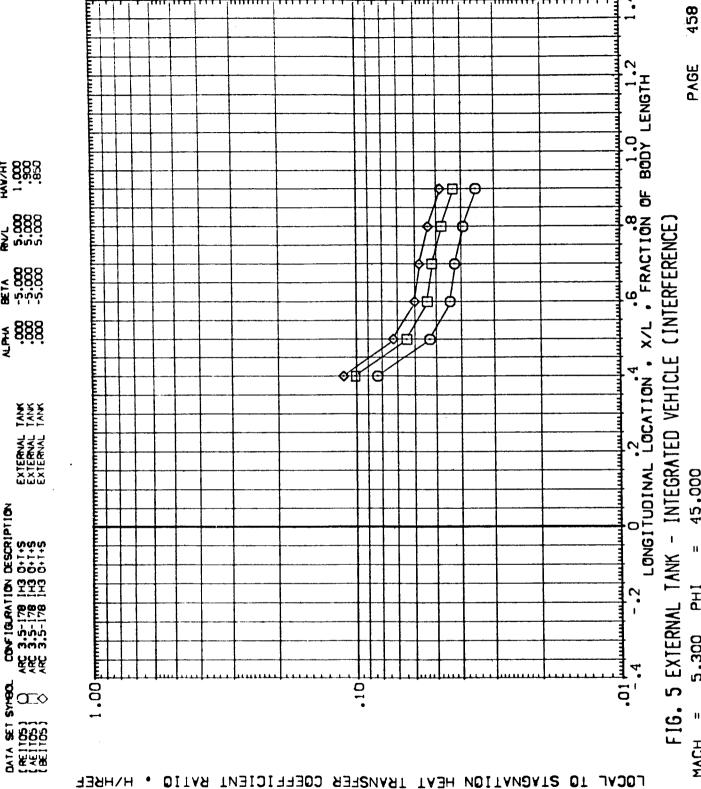






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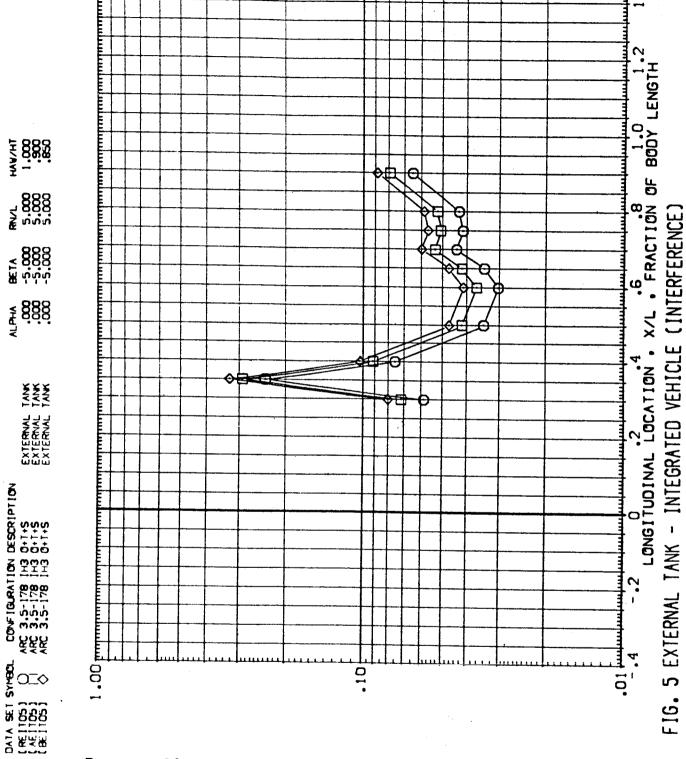
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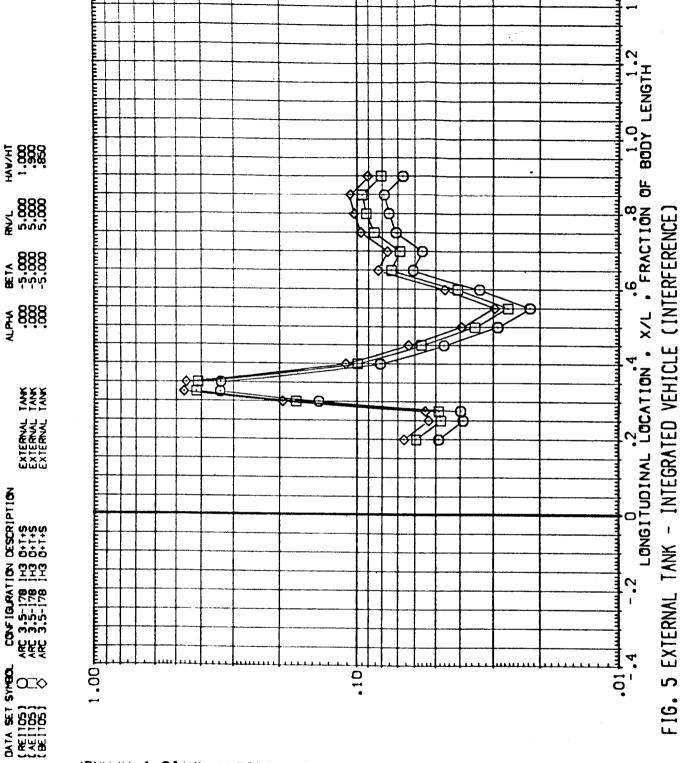
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



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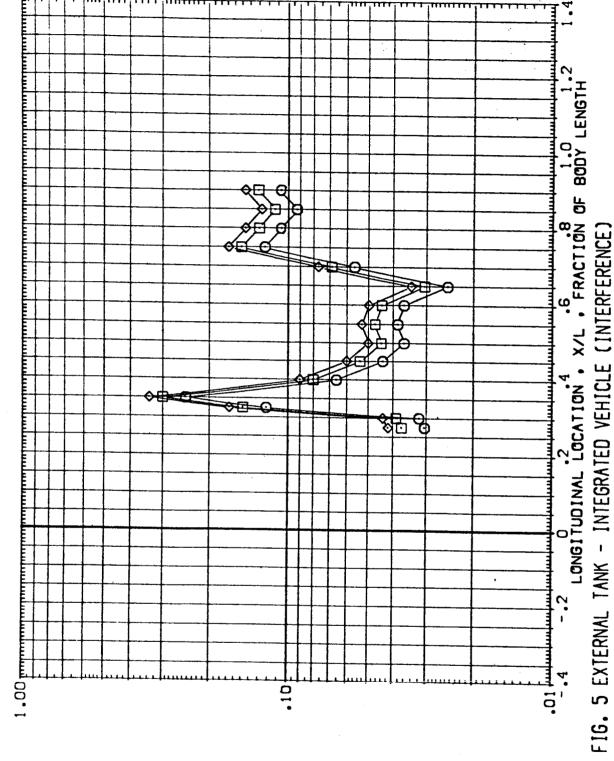
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5,300

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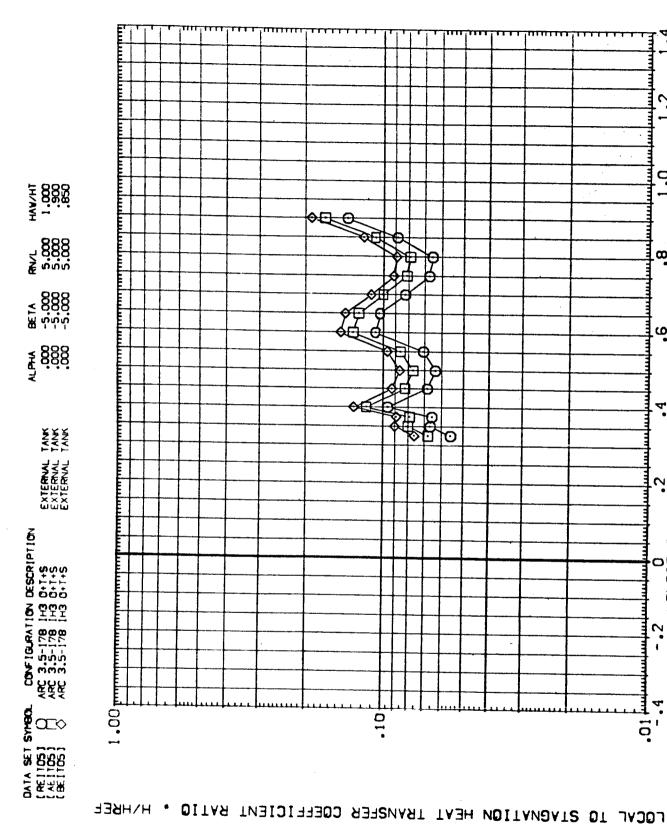




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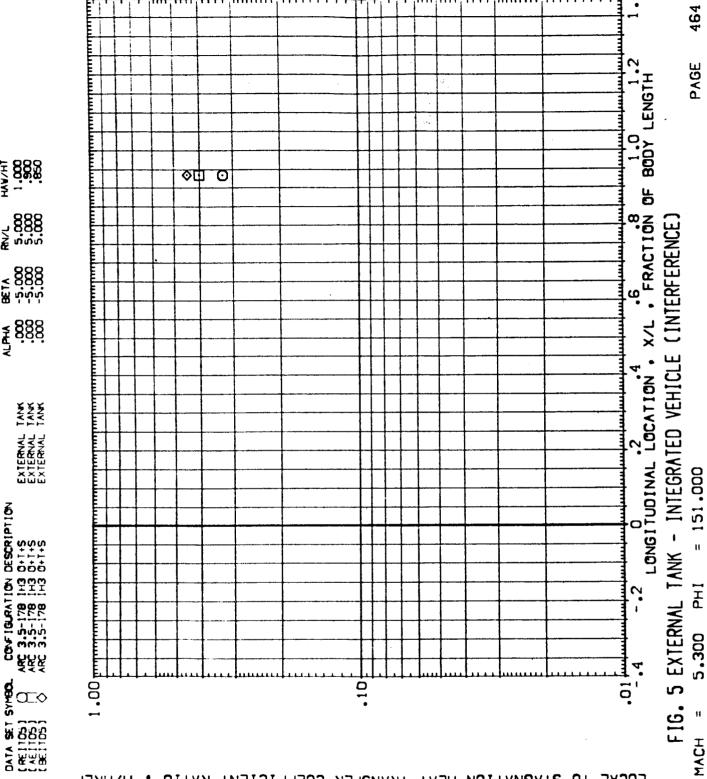
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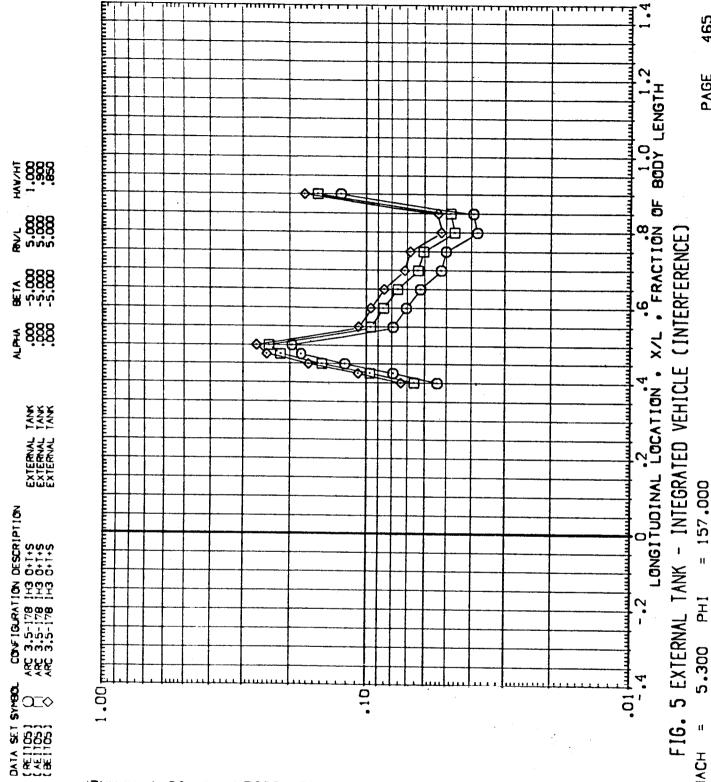


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FOCYF 10 STAGNATION HEAT TRANSFER COEFFICIENT RATIO

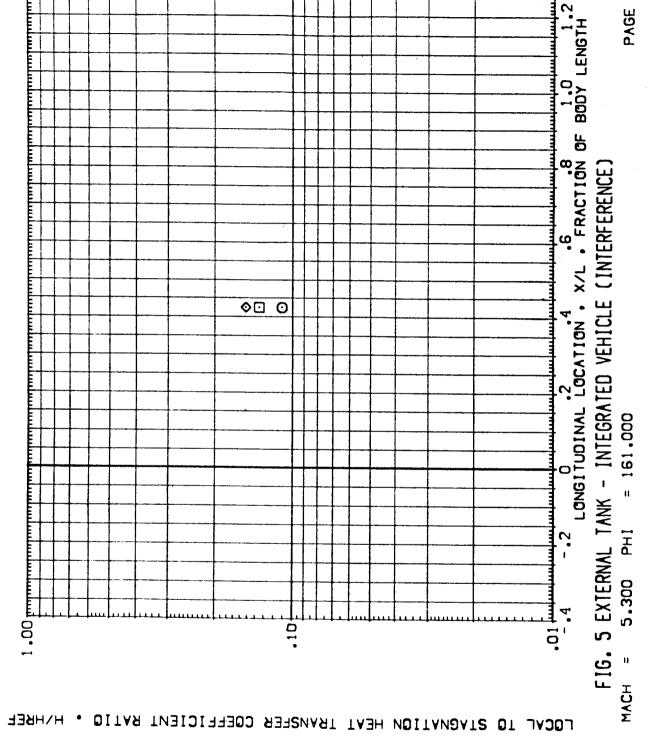






LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

HAVH - 089: - 089: - 089: - 089: 8.17 -5.000 -5.000 -5.000 ₹ 8888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 0ATA SET SYMBO. (**E1105.) (**E1105.) (**E1105.)



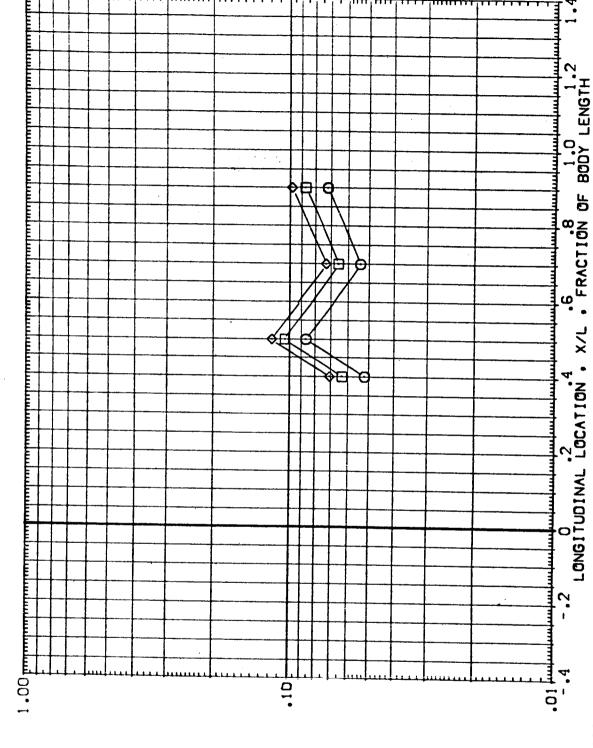


PAGE



1.000 1.000 850

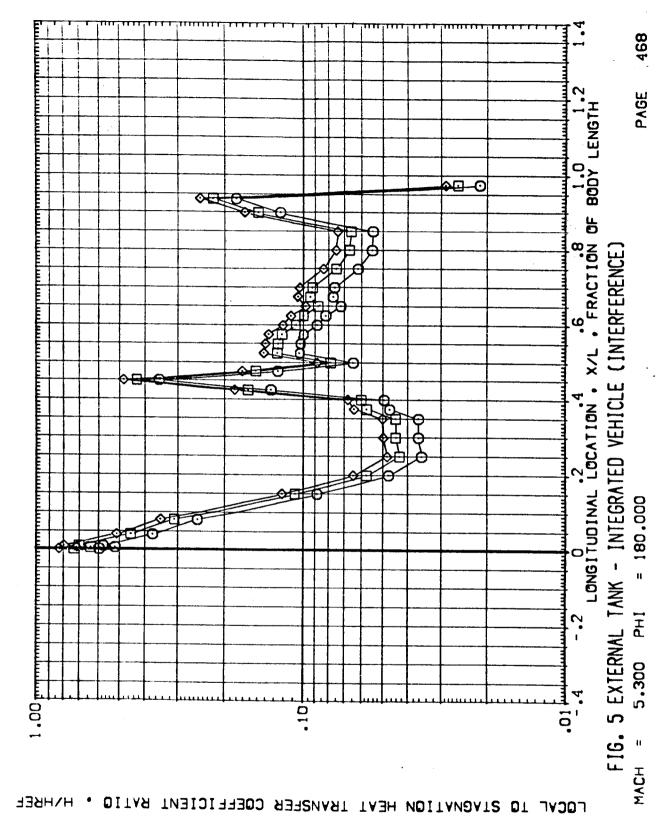
₹ ∾∾∾ 9000 0000

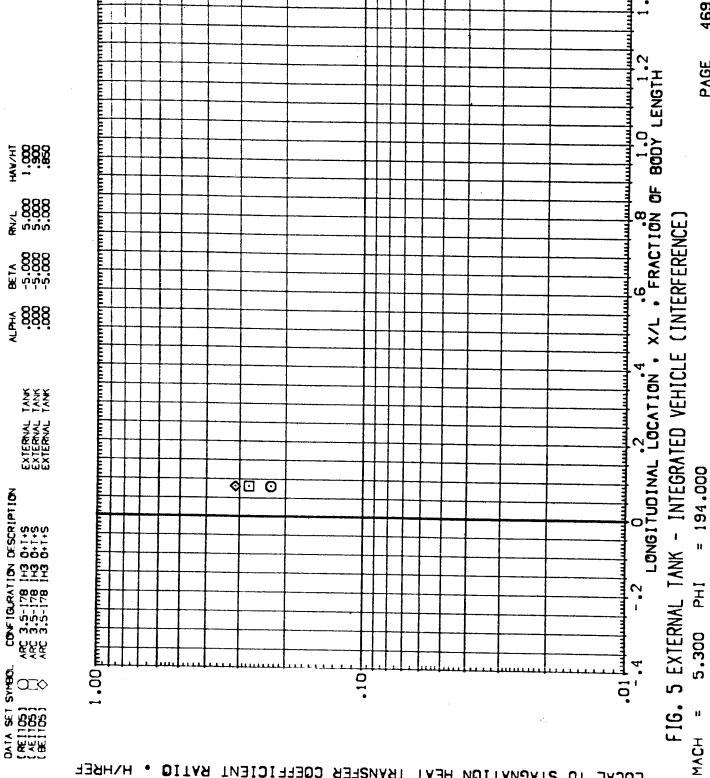


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

86.17 -5.000 -5.000 -5.000 A 6888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 0.0550R1PT10N 1.0+T+S 1.0+T+S 1.0+T+S ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 0ATA SET SYNBO. (AE1105) (BE1105) (BE1105)

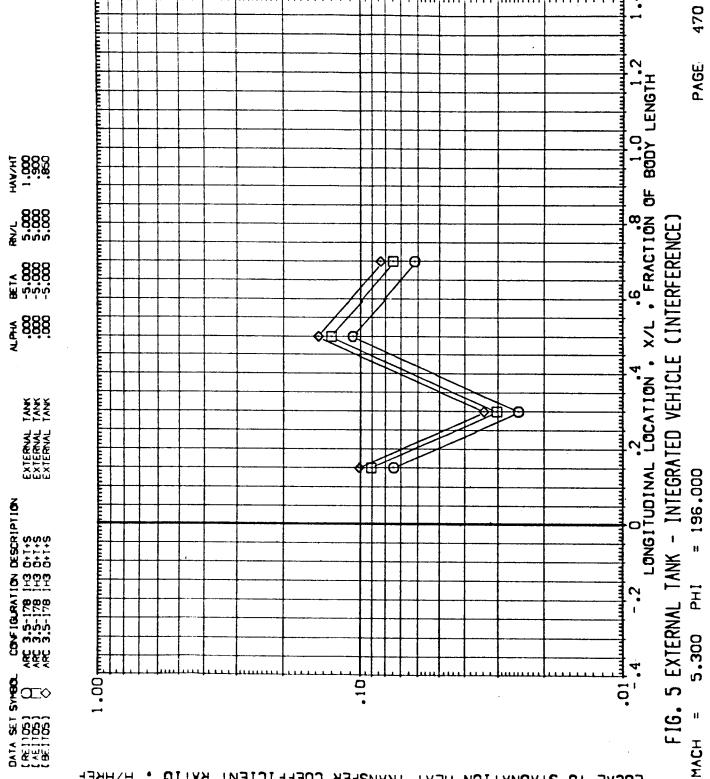


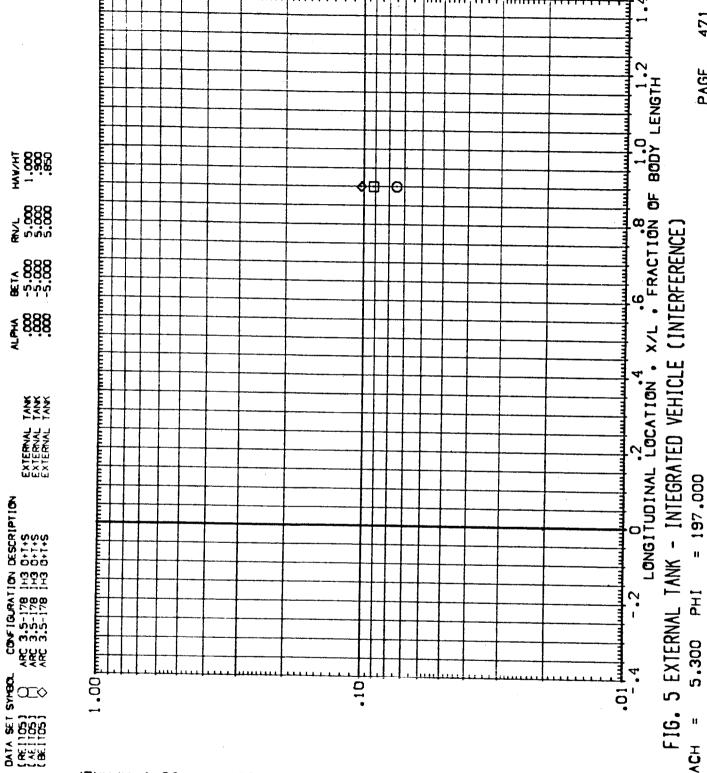




LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

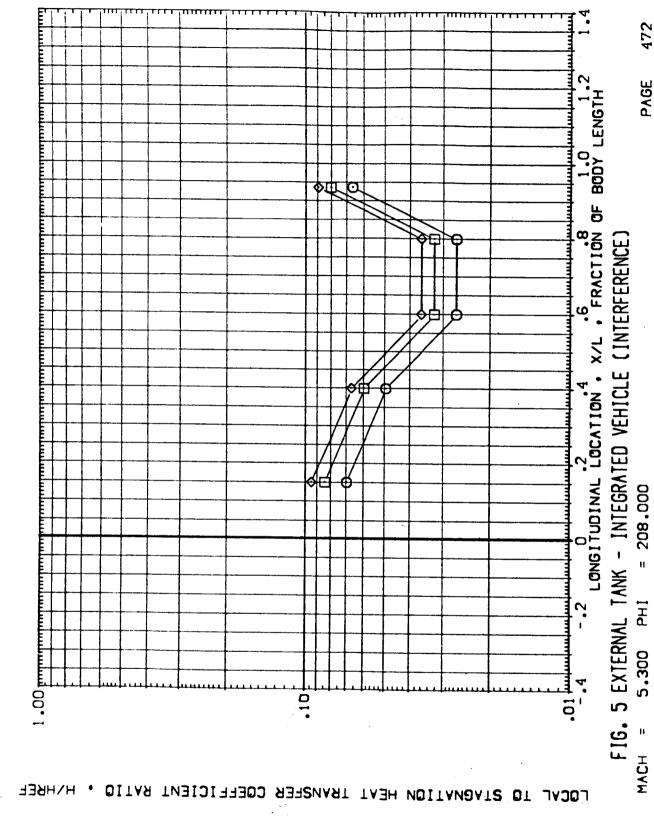
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

1.000 1.000 850 850

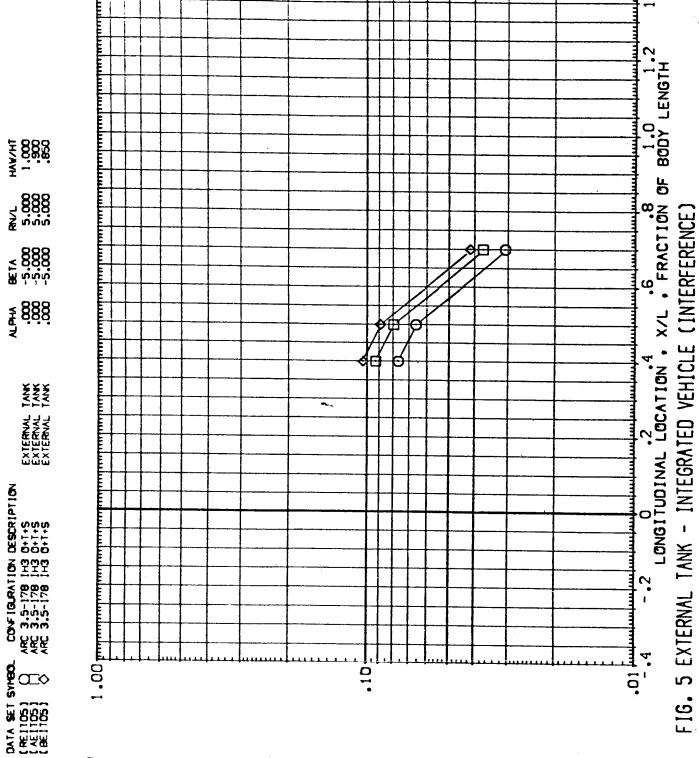




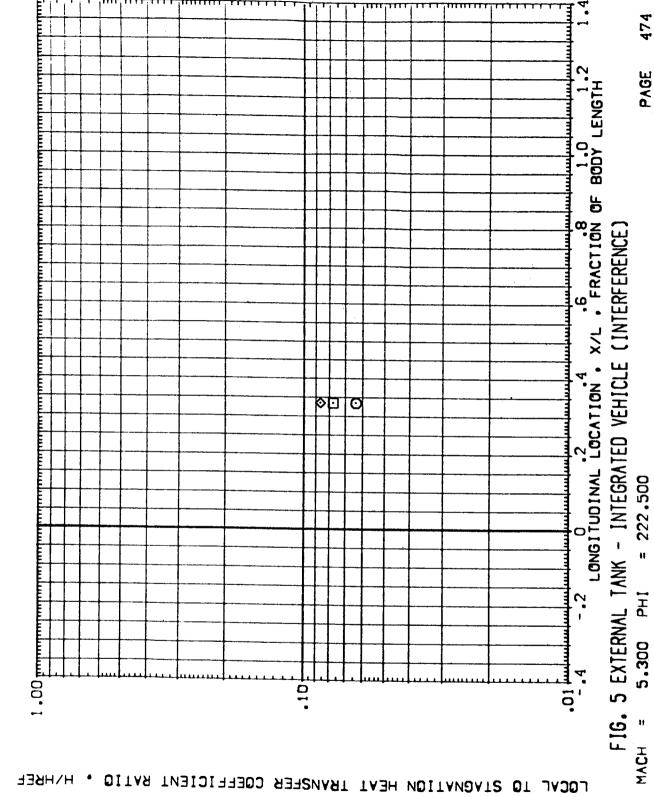
216,000

PH.

5,300

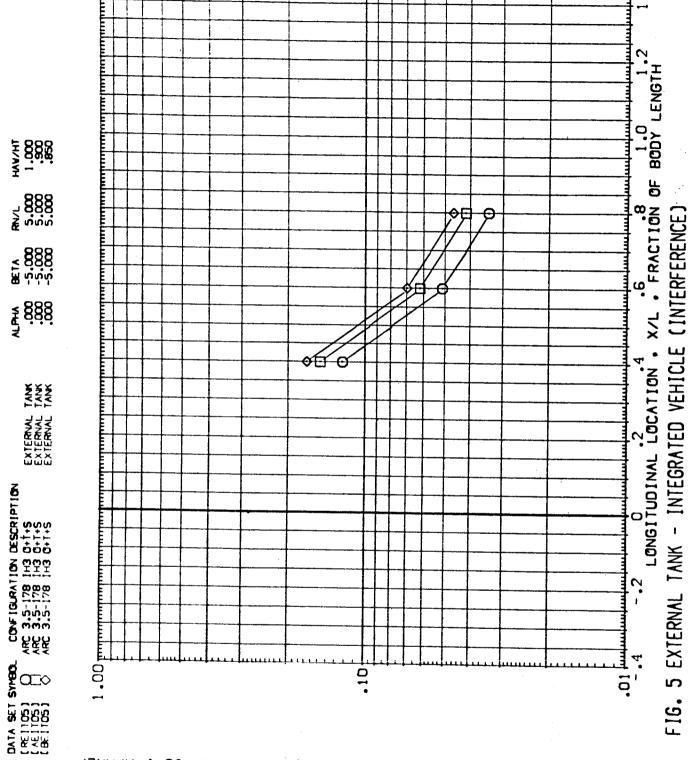


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



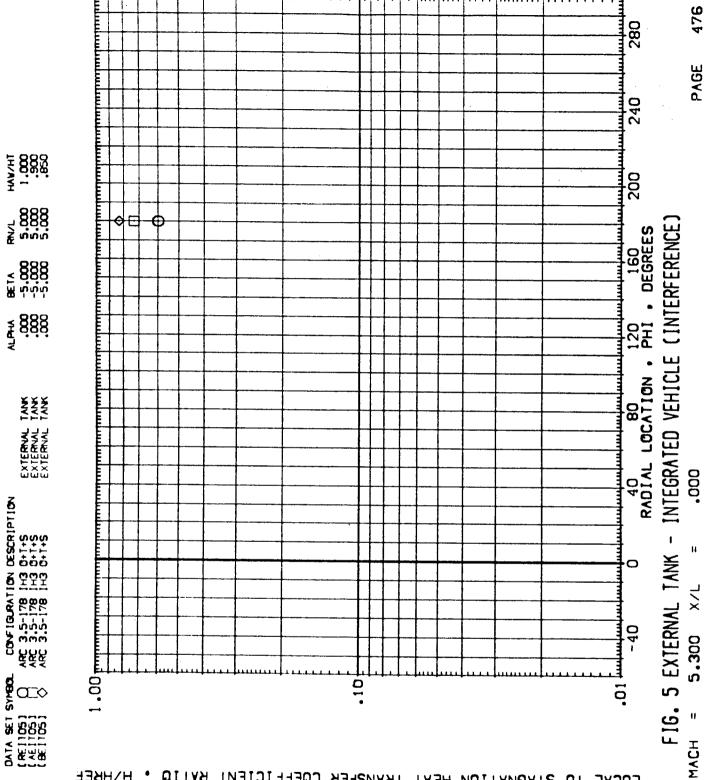


229,000



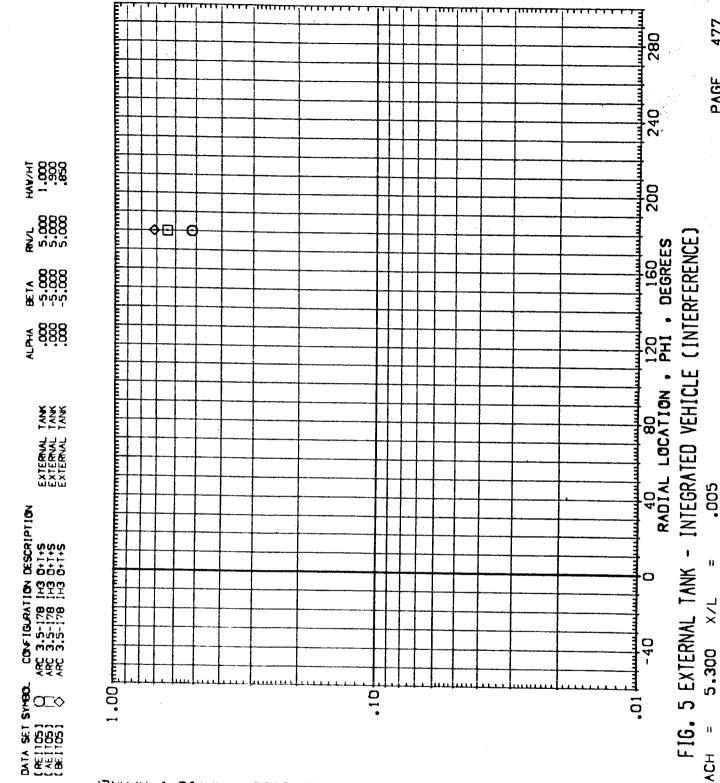
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

1.000 1.000 850 850 4 988 988 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREE





FOCYT 10 SIVENVIION HEVI IBANSHER COEFFICIENT RATIO . HAHREF

1.000 1.000 850 850 ₹ ∾∾∾ 9869 988 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 1 -00 քաղադուդուդուդուդուդուդու QATA SET SYMBO. (*RE11GS) (*AE11GS) (*RE11GS) 10

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



PAGE

280

200

INTEGRATED VEHICLE (INTERFERENCE)

FIG. 5 EXTERNAL TANK -

5.300

MACH

.010

RADIAL LOCATION , PHI , DEGREES

0

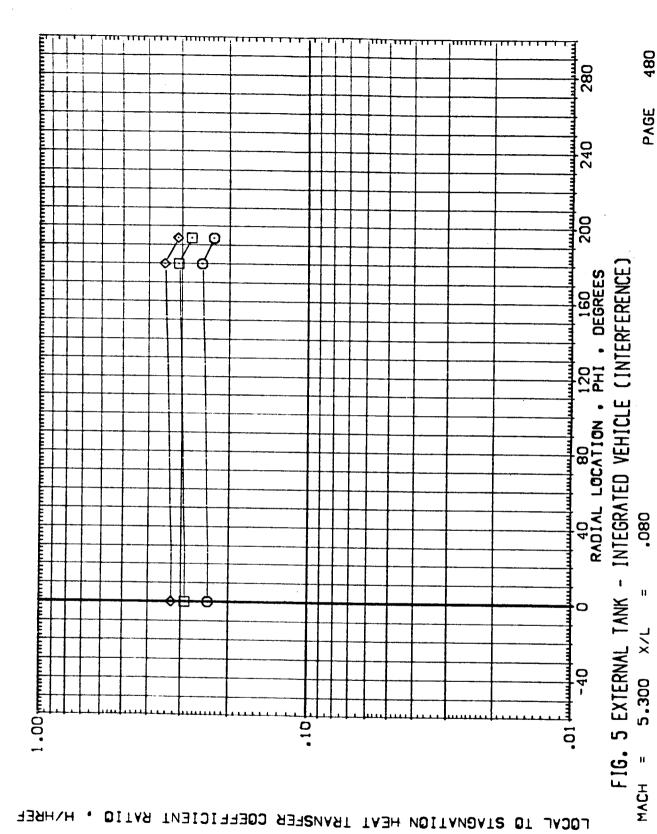
DATA SET SYMBOL CONFIGURATION DESCRIPTION

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 [AE1105] ARC 3.5-178 | H3 0+1+5 EXTERNAL TANK
 [BE1105] △ ARC 3.5-178 | H3 0+1+5 EXTERNAL TANK

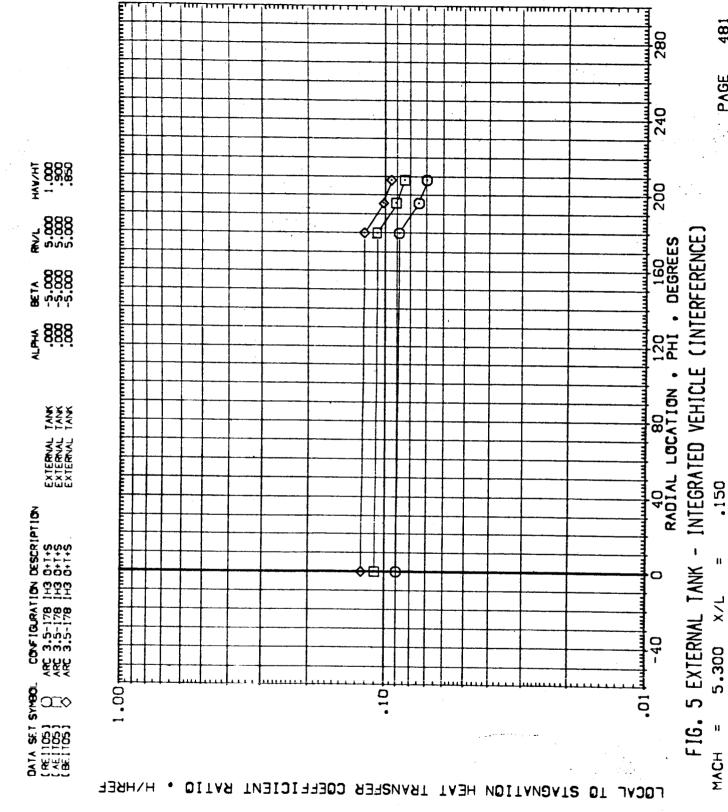
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₹ 8000 8000 8000

₹ 888







HAYH 0009 0009 0009 ₹ ოოო 2000 0000 4 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+15 ARC 3.5-178 IH3 0+15 ARC 3.5-178 IH3 0+15 1 •00 բողոպոպոպոպուդ 0ATA SET SYMBO. (RE1105) (AE1105) (BE1105) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) H = 5.300 ×/L = .200

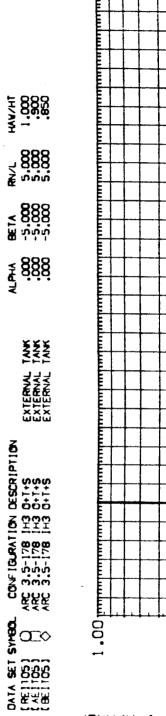
PAGE

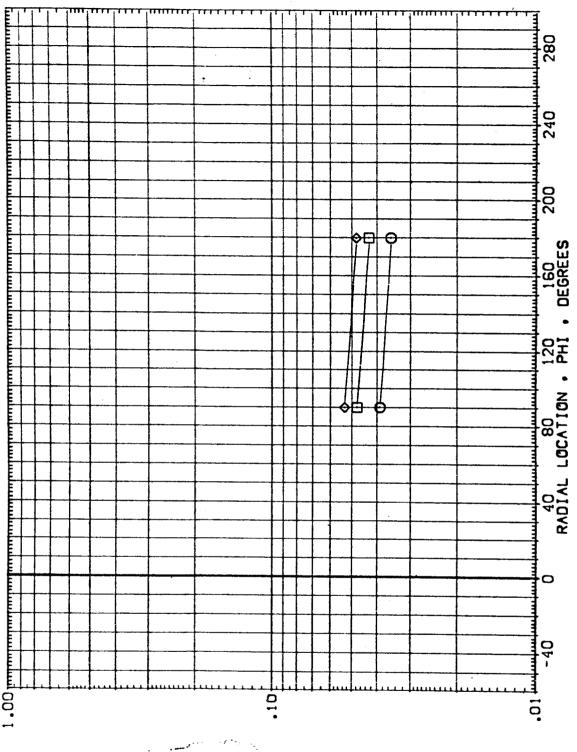
280

200

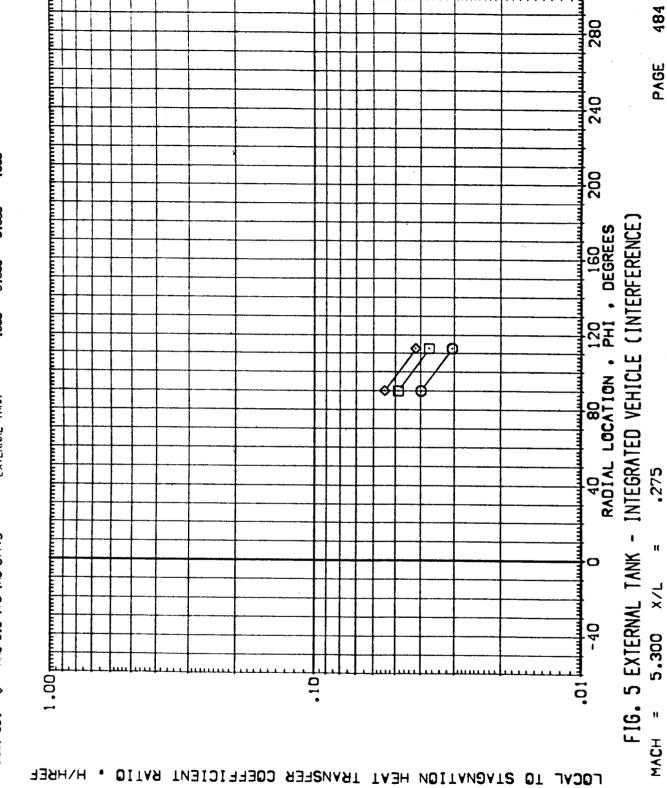
40 80 120 160 RADIAL LOCATION • PHI • DEGREES

<u>.</u>



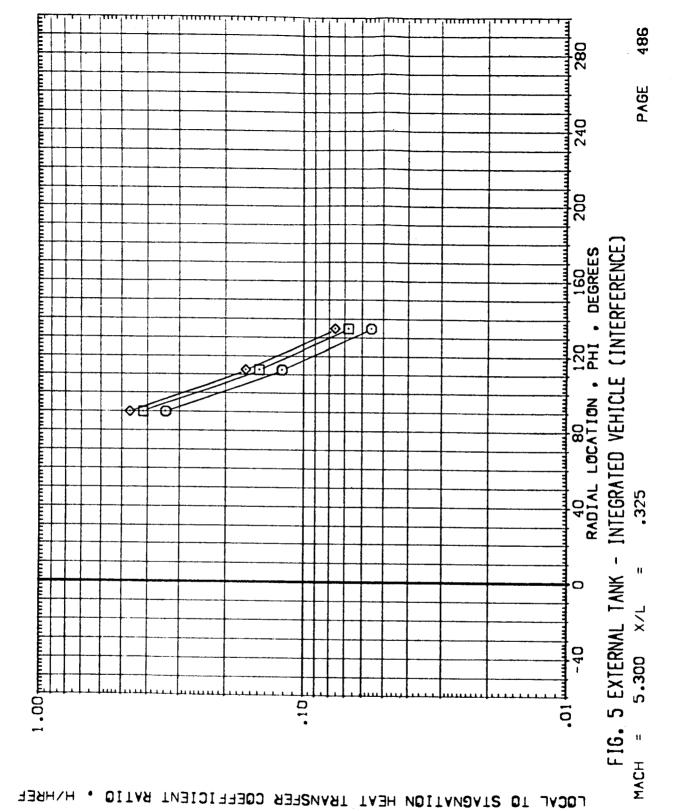


HAW/H 000.000 000.000 ₹ **∾**∾∾ 9869 888 # T^ -5.000 -5.000 -5.000 ₹ **88**8 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 ARC 3.5-178 H3 0+1+5 ARC 3.5-178 H3 0+1+5 PATA SET SYMBO.
[RE1105] (AE1105) (AE1105)

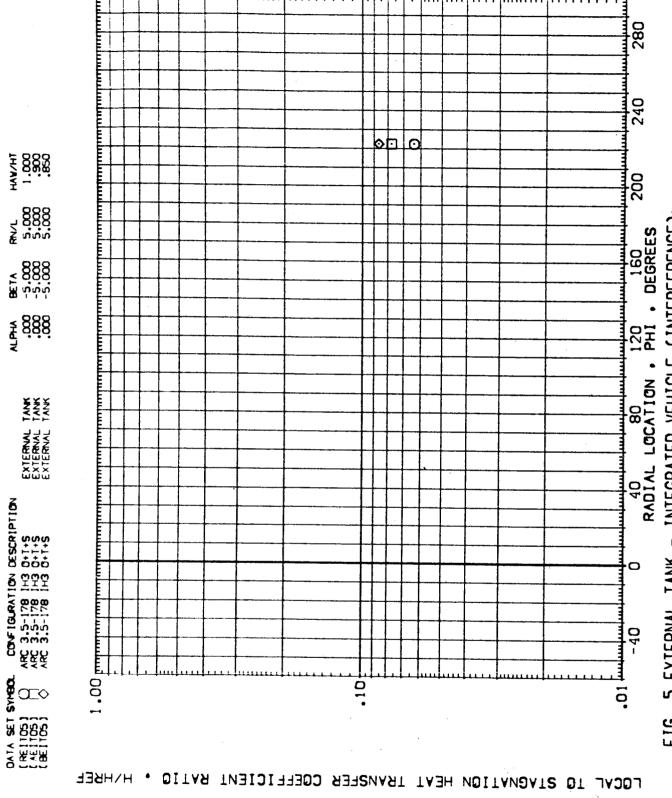




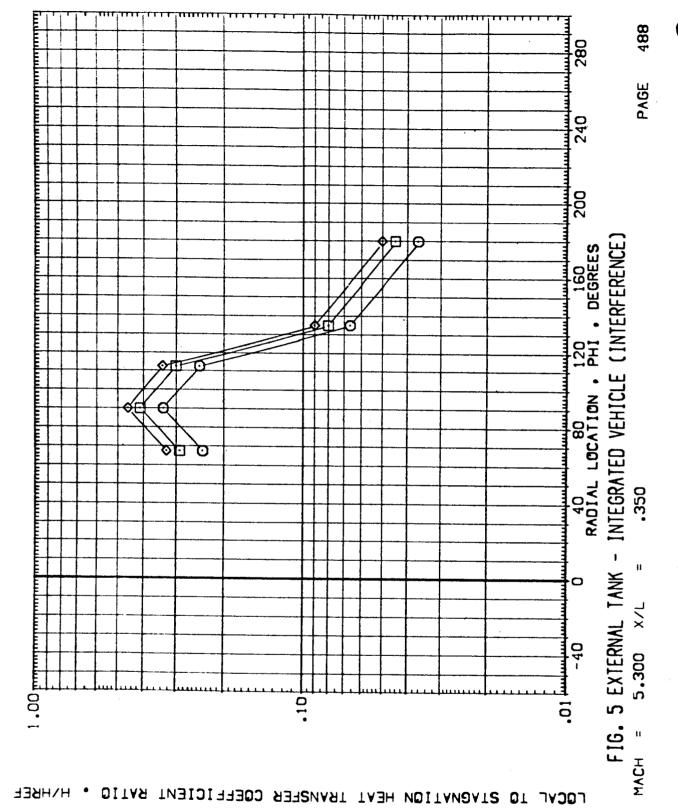
HAYH1 900 850 850 850 # 17 × 1.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · 5.000 · ₹ 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 D+1-5 ARC 3.5-178 1H3 D+1+5 ARC 3.5-178 1H3 D+1+5 DATA SET SYMBOL (*RE1105)







1.000 1.000 8500 8500 8500 ₹ 9999 9000 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 DATA SET SYMBOL (ME1105) (AE1105)





490 280 240 1.000 900 950 950 200 ₹ %%% 988 888 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 160 • DEGREES **Q** ₹ 8668 \$ 40 80 120 RADIAL LOCATION , PHI EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK O CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 1.00,1 10 9 $O = \Diamond$ DATA SET ((RE1105) (AE1105) (BE1105) MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

PAGE 240 HAW/HT 1.000 1.000 1.000 1.000 1.000 200. FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) AO 80 120 160 RADIAL LOCATION • PHI • DEGREES ## ## -5.000 -5.000 -5.000 O ₹ 8889 8880 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .425 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 1 • 00 քուդոարարադապարո × × 5,300 0ATA SET SYMBOL. (RE1105) C (AE1105) C 10 0. MACH = LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HYHREF

1.000 1.000 850 ₹ ∾∾∾ 2000. 2000. # 17 -5:000 -5:000 -5:000 ¥ 8866 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5

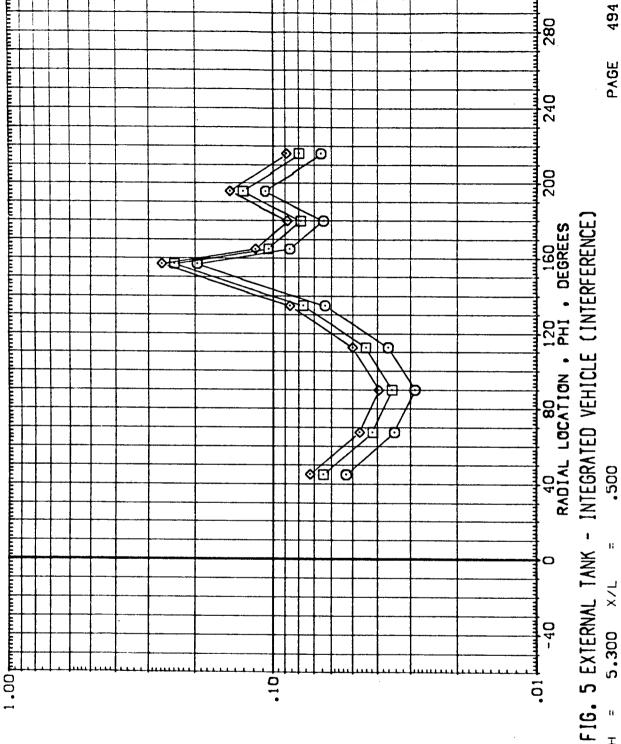
492 PAGE 200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES .450 1 • 00 բուրարարարարարար ×// -40 5.300 DATA SET SYNBO. (PETIGS) (AETIGS) (PETIGS) 10 0 MACH

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF



1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 # 174 2.000 2.000 2.000 3.000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 0A1A SET SYMBOL (RE1105) (AE1105) (BE1105) ♦

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER





INTEGRATED VEHICLE (INTERFERENCE) AO 80 120 160 RADIAL LOCATION • PHI • DEGREES FIG. 5 EXTERNAL TANK -5.300 101 0 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HYHREF

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HAW/HI 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000

₹ 2000 2000 2000

8£17 -5.000 -5.000 -5.000

₹ 986 588

EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK

CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+15 ARC 3.5-178 IH3 0+15 ARC 3.5-178 IH3 0+15

DATA SET SYMBO.
(RE1105)
(AE1705)
(BE1705)

1.00

495

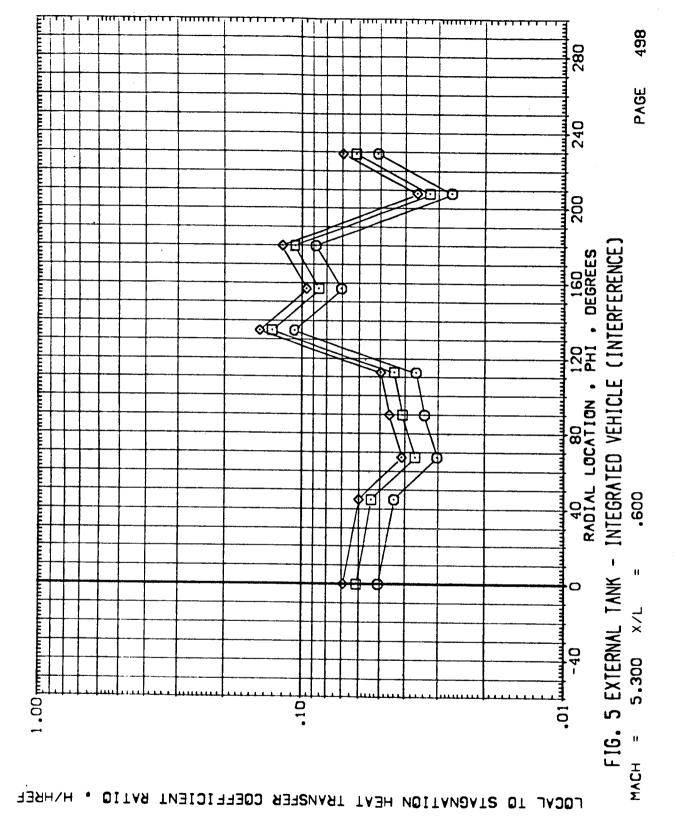
PAGE

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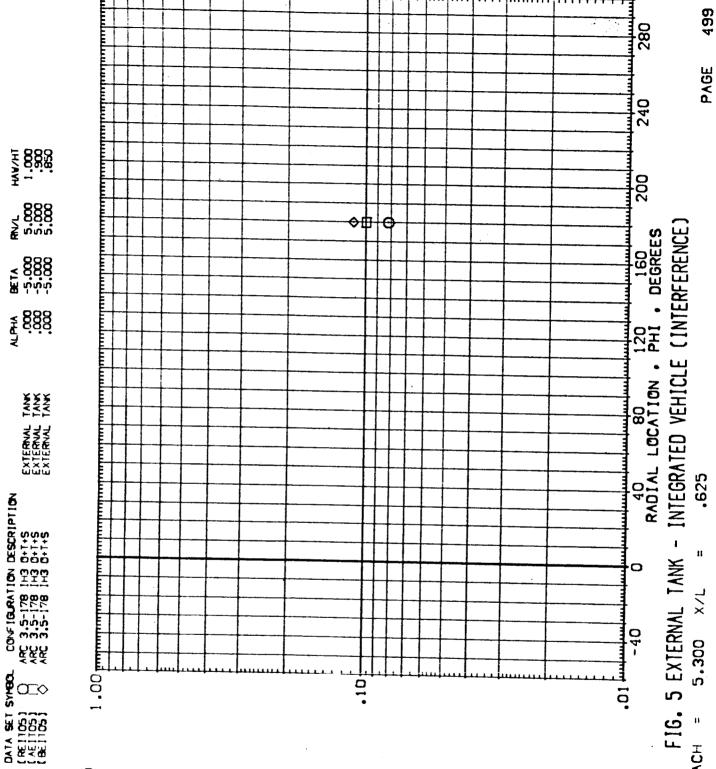
496 280 PAGE 200 \$ 000 \$886 688 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) RADIAL LOCATION . PHI . DEGREES # v.v.v. 900.00 ₹ 8888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .550 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 1 • 00 բույրույրույրույրույ ×× 5.300 **§** C C ◇ 0. OMIA SET S (RE1105) (AE1105) (BE1105) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF



HVH 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1. 8£1A -15.000 -5.000 -5.000 ¥ 888 CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 DATA SET SYMBOL (PE1105) (AE1105) (BE1105)

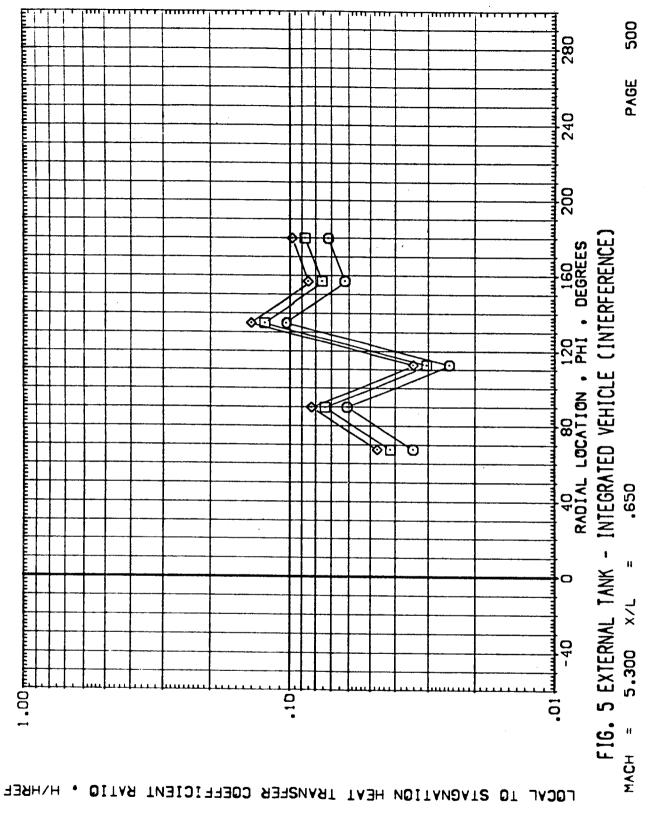






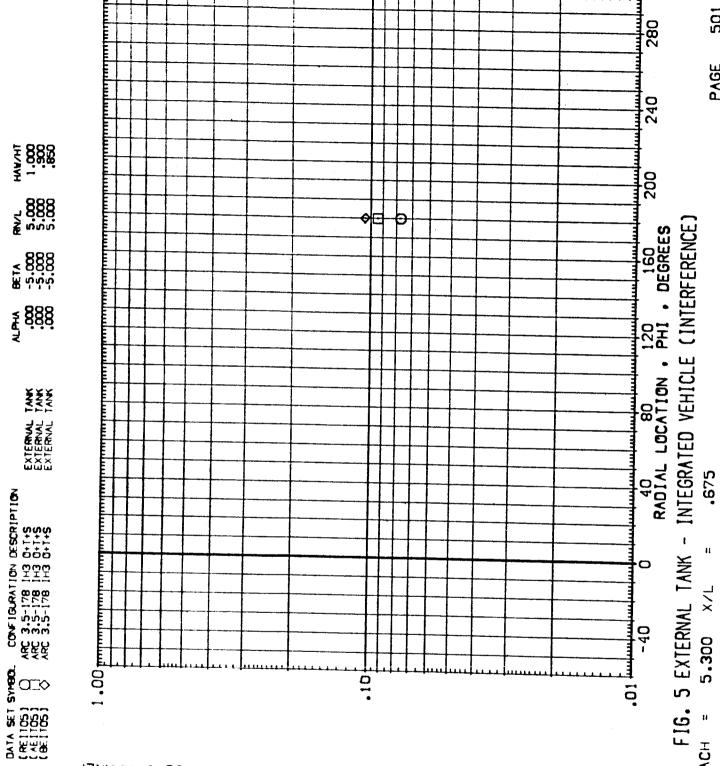
TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

1.000 1.000 1.000 1.000 1.000 1.000 8£17 -5.000 -5.000 -5.000 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK DESCRIPTION 0+1+S 0+1+S 0+1+S ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 ARC 3.5-178 1H3 0 0ATA SET SYNBOL (RE1105) (AE1105) (BE1105)





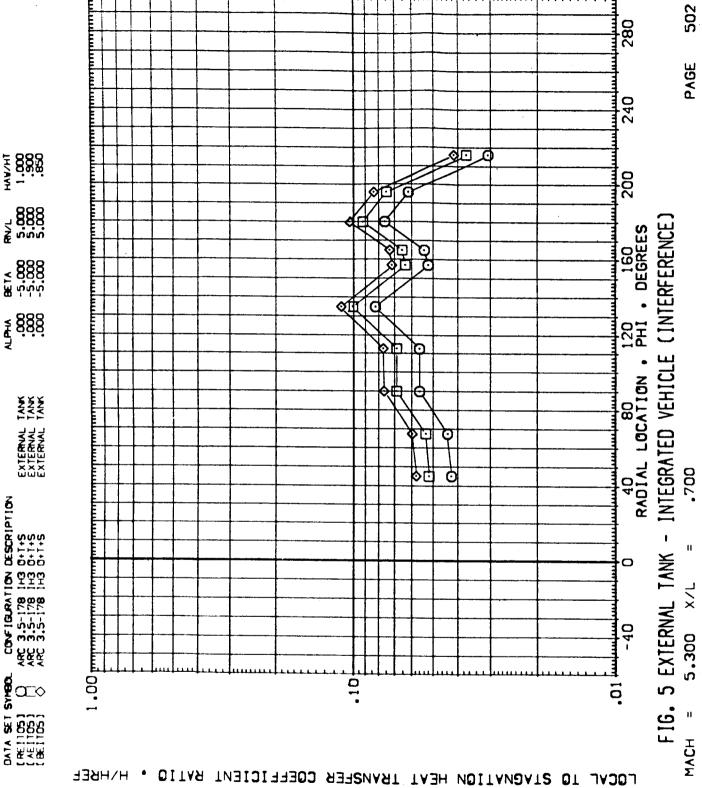
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PAGE 501

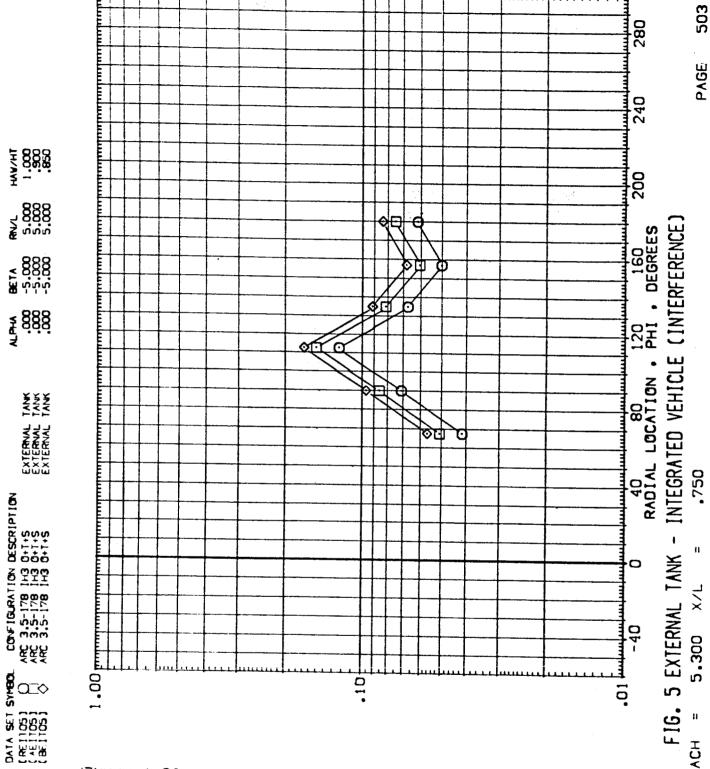
MACH =

₹ - 0000 85000 ₹ ∾∾∾ 988 988 86 -5.000 -5.000 -6.000 ₹ **888** EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5





LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



504 280 PAGE 240 HAW/HT - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 200 ₹ 889.8 888 INTEGRATED VEHICLE (INTERFERENCE) 40 80 120 160 RADIAL LOCATION . PHI . DEGREES D CITE ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .800 8 ø CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 FIG. 5 EXTERNAL TANK -0 5.300 1 • 00 բոպոտ 10 <u>.</u> ∞ DATA SET (RE1105) (AE1105) (AE1105) (BE1105) MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

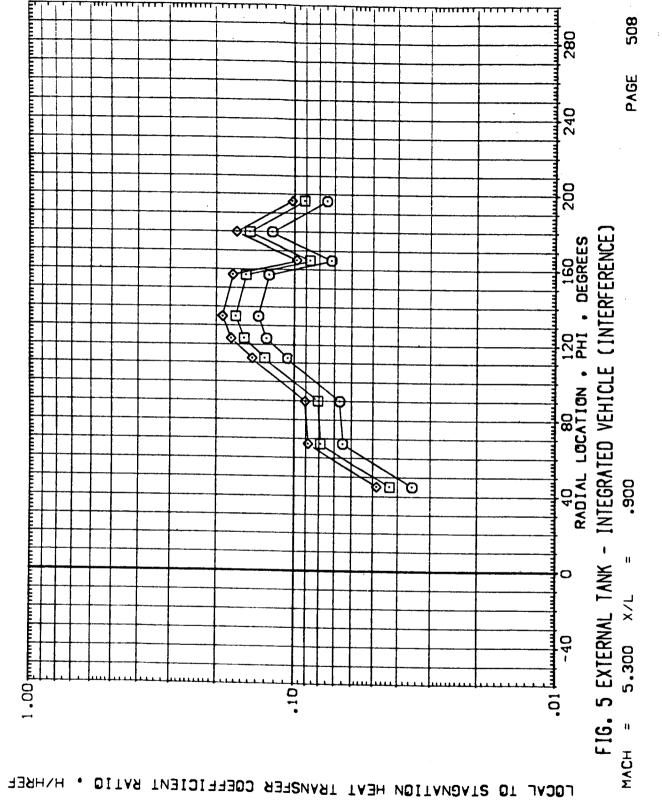


LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

506 280 PAGE HAWAH -- 600000 INTEGRATED VEHICLE (INTERFERENCE) AO 80 120 160 RADIAL LOCATION • PHI • DEGREES 8.17 -5.000 -5.000 000 ₹ 9888 .850 CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 C+15 ARC 3.5-178 IH3 C+15 ARC 3.5-178 IH3 C+15 FIG. 5 EXTERNAL TANK -1.00 բուդուդուա 101 0 MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

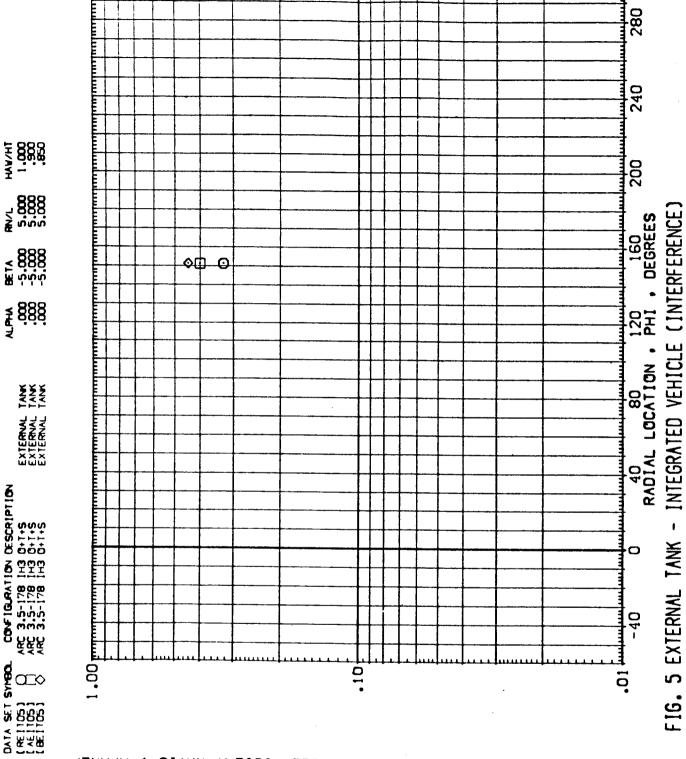


HAW/HI - .000 850 850 ₹ ∾∾∾ 2000 0000 # ± 5.000 -5.000 -5.000 -5.000 ¥ 8888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 0ATA SET SYMBO. (RE1105) (AE1105) (BE1105)





1.000 900 850 850 ₹ ოოო 2000 1000 1000 ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRE

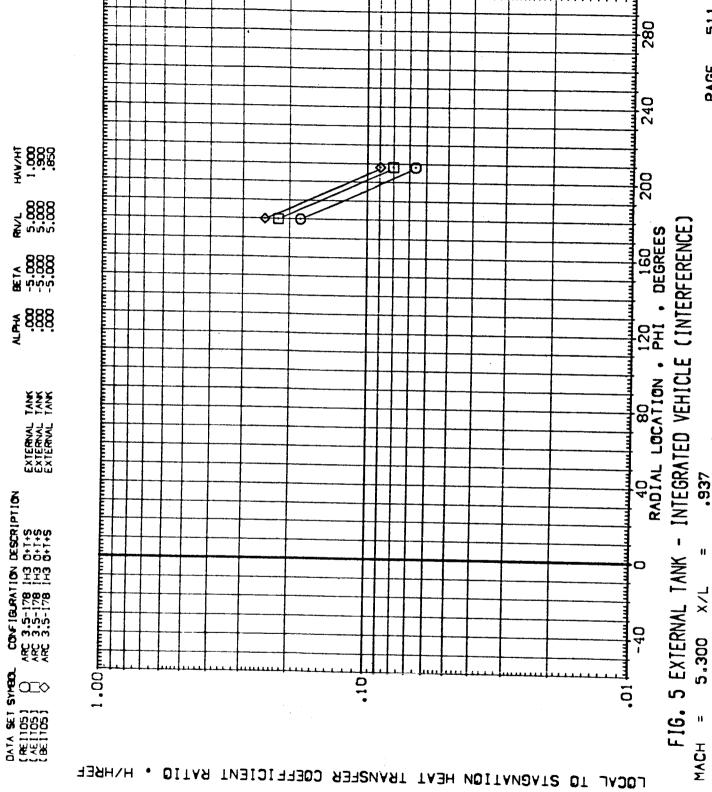


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HVH 1.000 1.000 1.000 1.000 ₹ 8669 9869 A 25.000 20.000 20.000 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5

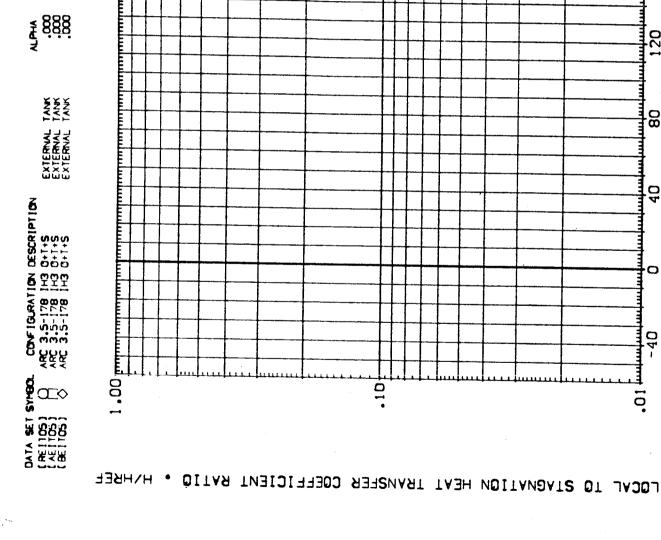
512 PAGE 200 INTEGRATED VEHICLE (INTERFERENCE) AD 80 120 160 RADIAL LOCATION . PHI . DEGREES **◊**□ 0 .960 1 -00 բուցուդրուդրուդուդուդ FIG. 5 EXTERNAL TANK --40 5,300 DATA SET SYMBO.

(RE 1105)

(RE 1105) <u>.</u> MACH

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF





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%.000 0000 0000 0000 0000

85.7 -5.000 -5.000 -5.000

200 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) MACH

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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 000 .00. 4. 010 100

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF



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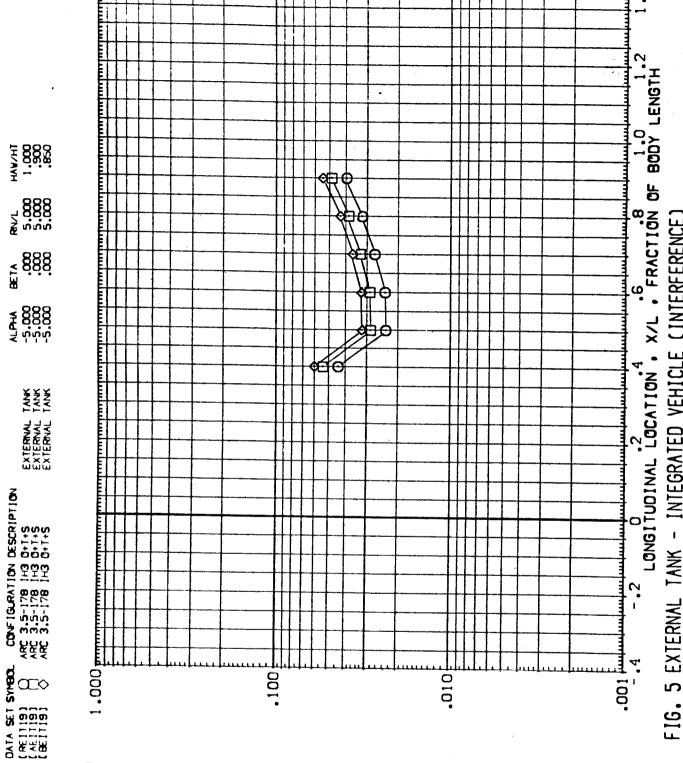
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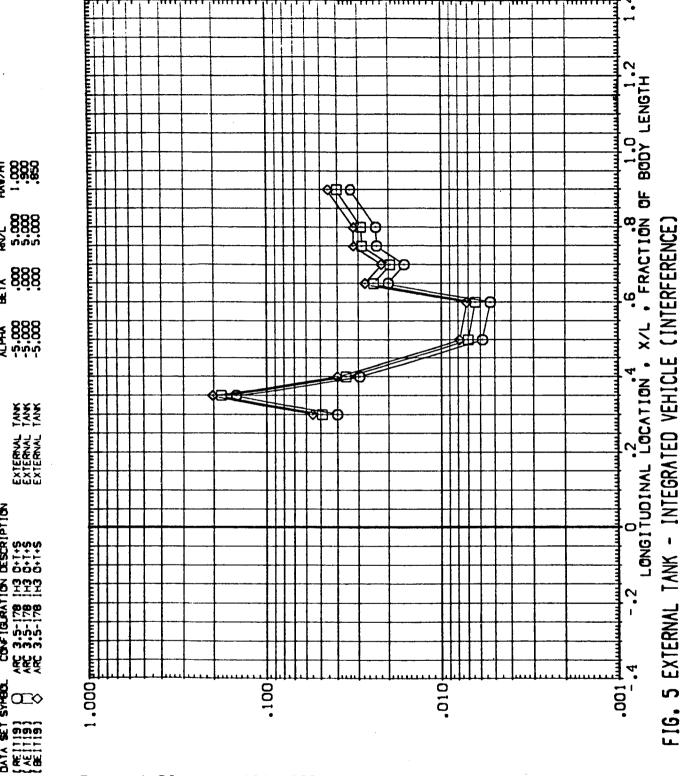
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) PHI 5.300 MACH

H/YH 8898 8008 ₹ **%**%% \$ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK DESCRIPTION 0+1+5 0+1+5 0+1+5 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3.5-178 H3 0 ARC 3. \mathbb{C}



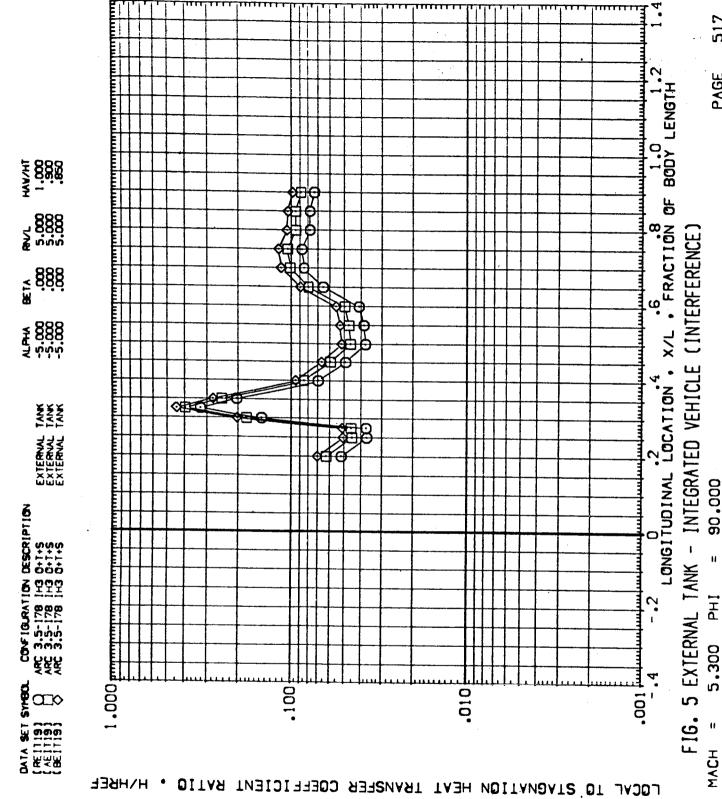
LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

67.500 E E 5.300 MACI

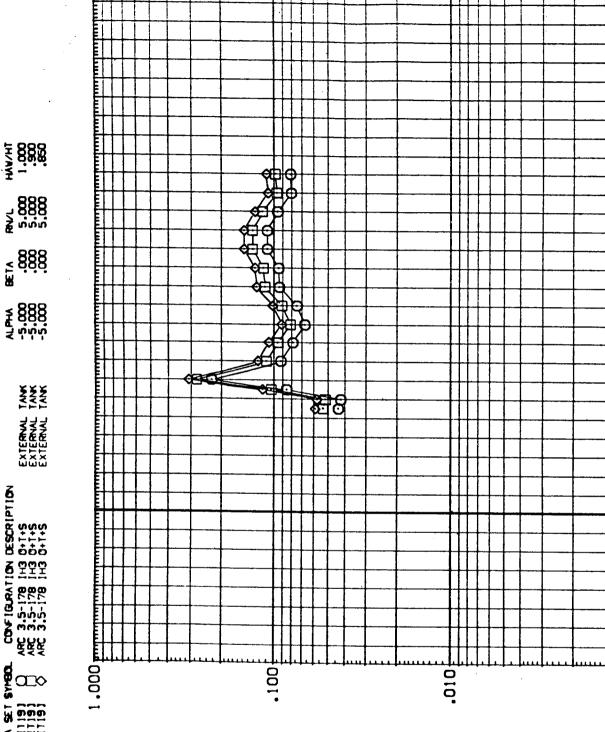
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A 10.00.00 10.00.00 10.00.00 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ∞ (AE1119) (AE1719)



LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



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LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

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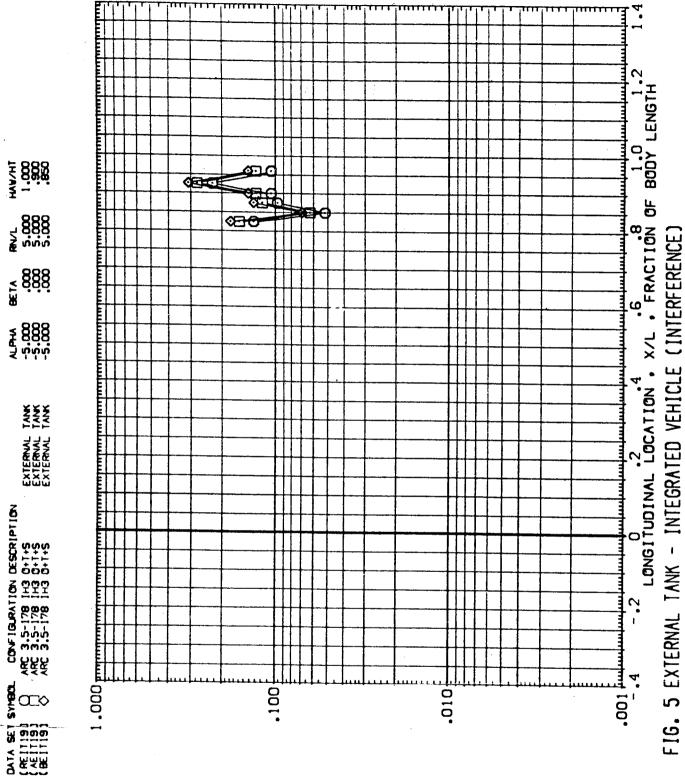
= 112.500

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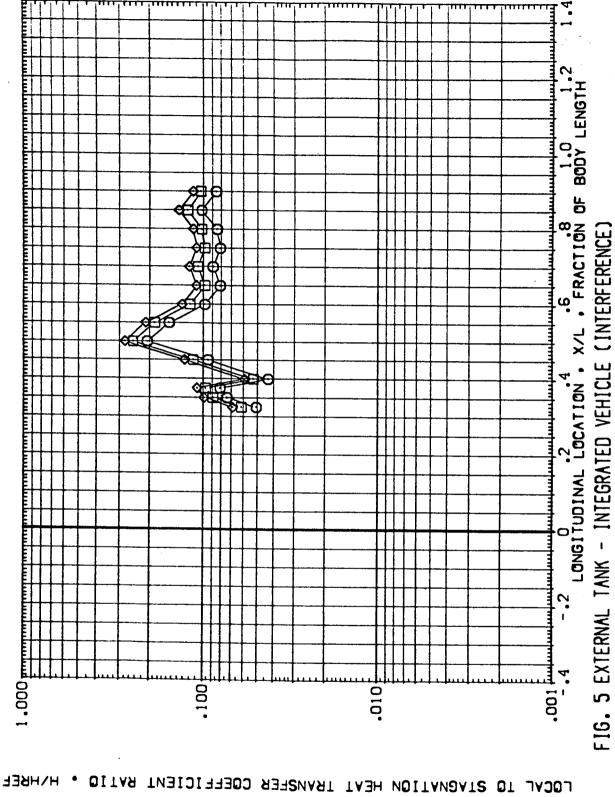
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

₹ ∾∾∾ 9899 889 ₹ 888 888 £ 45.65.65 800.00 800.00 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 DATA SET SYNBOL (RE1119) (AE1119)

1.000 1.000 0.000 0.000 0.000

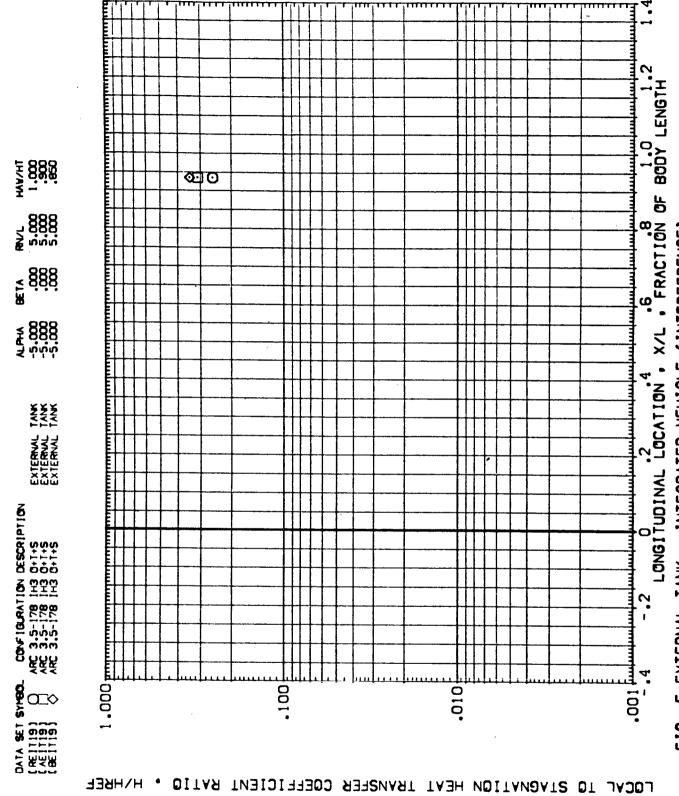




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FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

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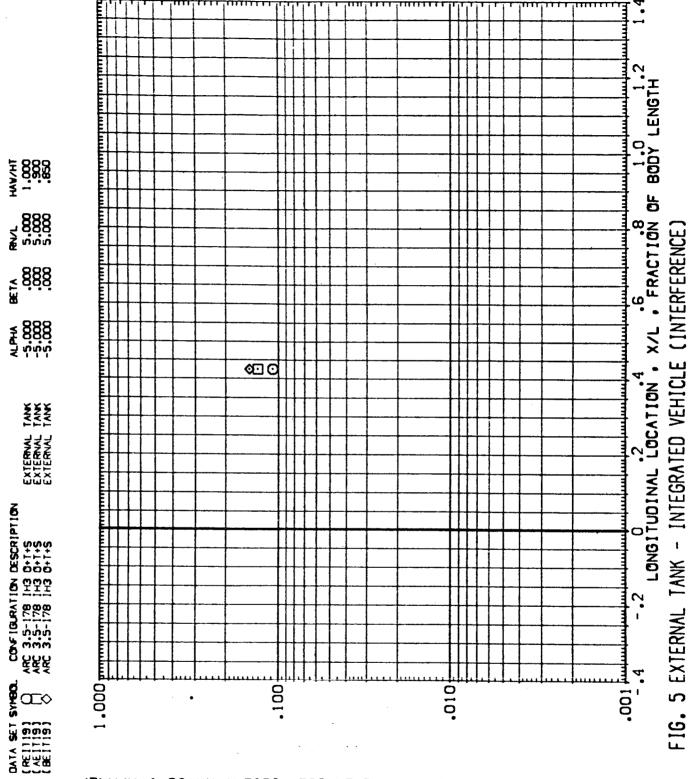
LONGITUDINAL LOCATION . X/L . FRACTION OF BODY LENGTH 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 ₹ ∾∾∾ 988 988 Å လုံလုံလုံ \$888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 100. 100 010 (RE1119) (AE1119) (BE1119) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

= 161,000

PH.

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HVHREF

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO



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FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE)

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

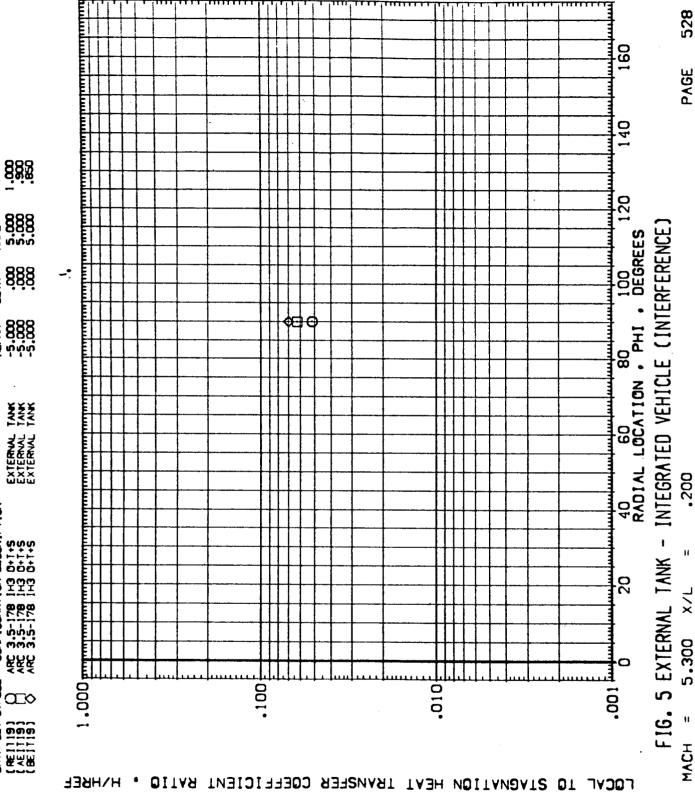
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160 PAGE 120 - INTEGRATED VEHICLE (INTERFERENCE: 40 60 80 100 RADIAL LOCATION . PHI . DEGREES FIG. 5 EXTERNAL TANK × 5.300 .001 T -010-100 (AE1119) (AE1719) (BE1719) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



FOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

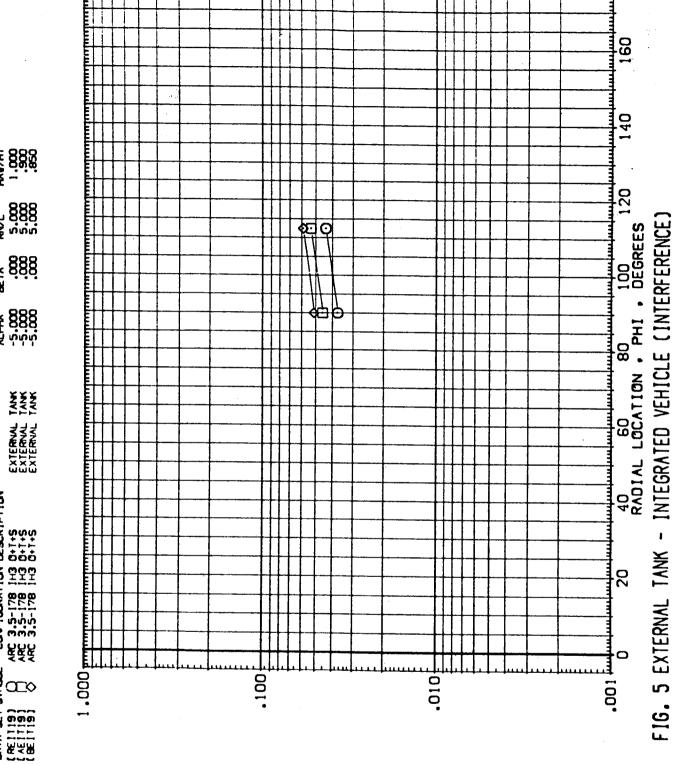
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529 160 PAGE 140 1.000 900 850 850 ₹ ∾∾∾ 888 888 # 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .250 CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 FIG. 5 EXTERNAL TANK × 5.300 **§** ∞ .100 010 1.000 .00 DATA 9ET (RE1119) (AE1119) (BE1119) LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARREF

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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER



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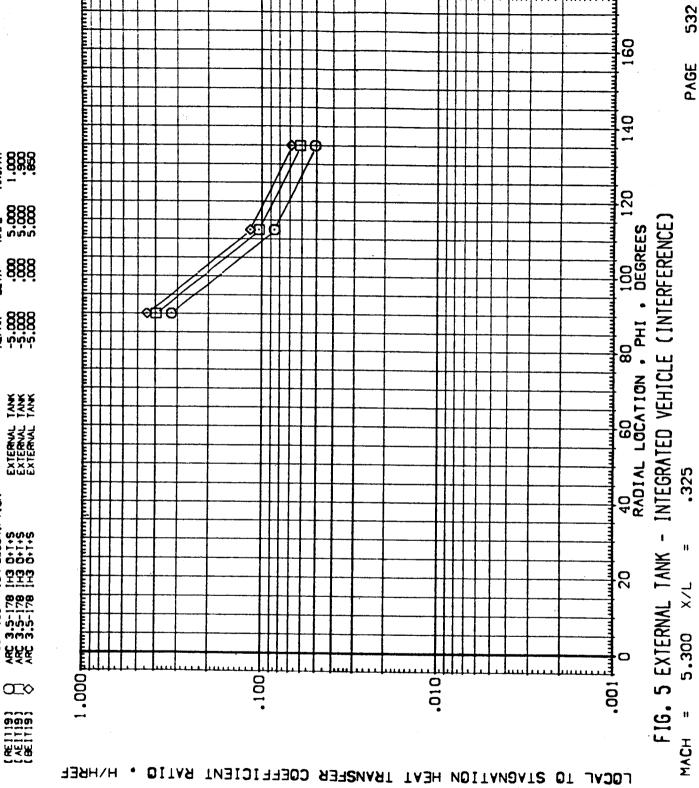
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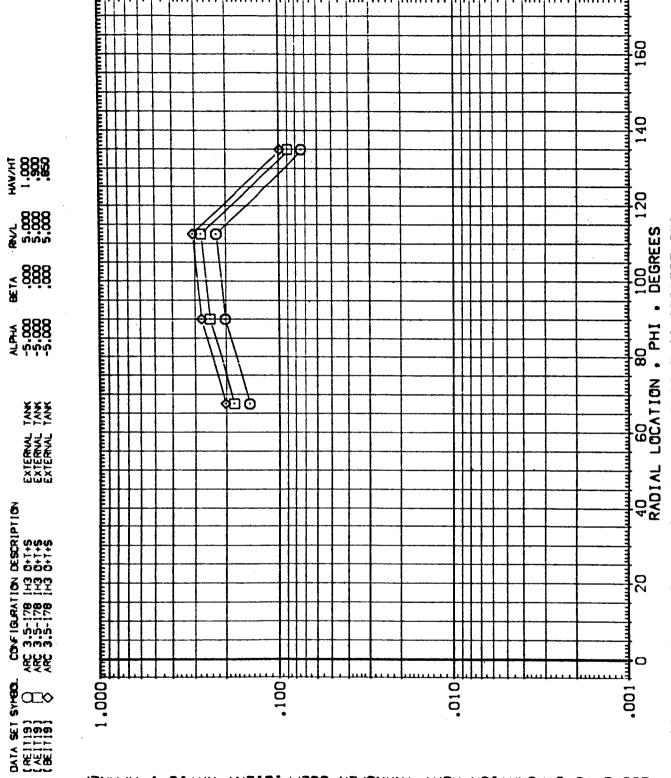
531 160 PAGE 140 120 ₹ 8869 888 INTEGRATED VEHICLE (INTERFERENCE) 40 60 80 100 RADIAL LOCATION • PHI • DEGREES # 888 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK **800**0 .300 CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 ARC 3.5-178 1H3 0+1+5 1 .000 թուգուարագրուդուդուդ FIG. 5 EXTERNAL TANK -11 2 5.300 X/L 1001. Ž œ> .010· .00 DATA SET 9 (RE1119) (AE 1119) (BE 1119) MACH " LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

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MACH



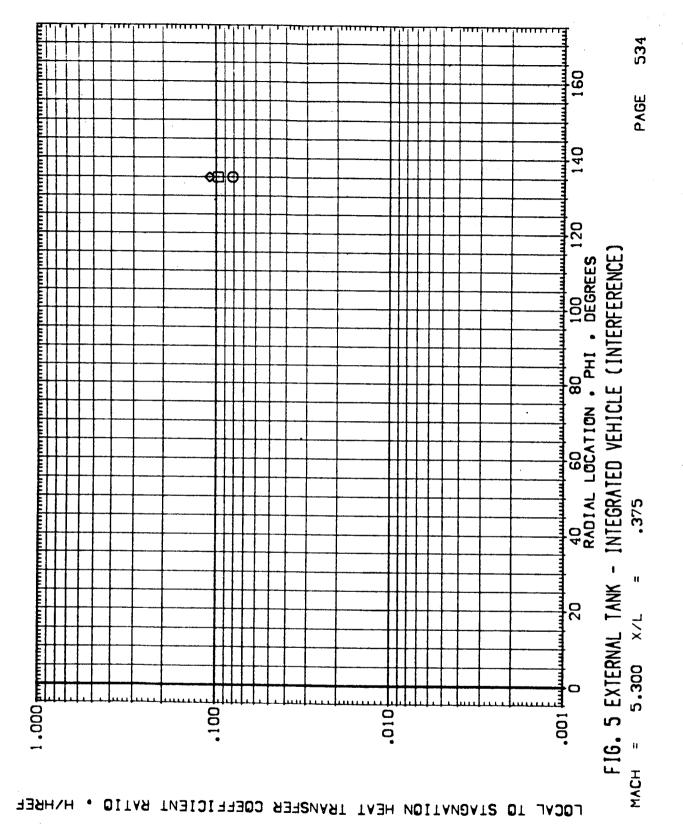
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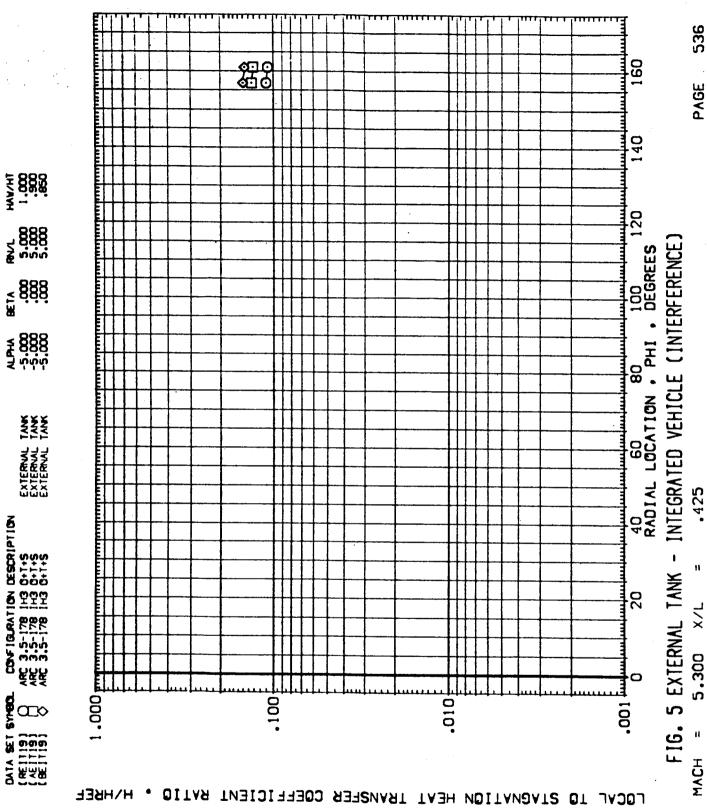
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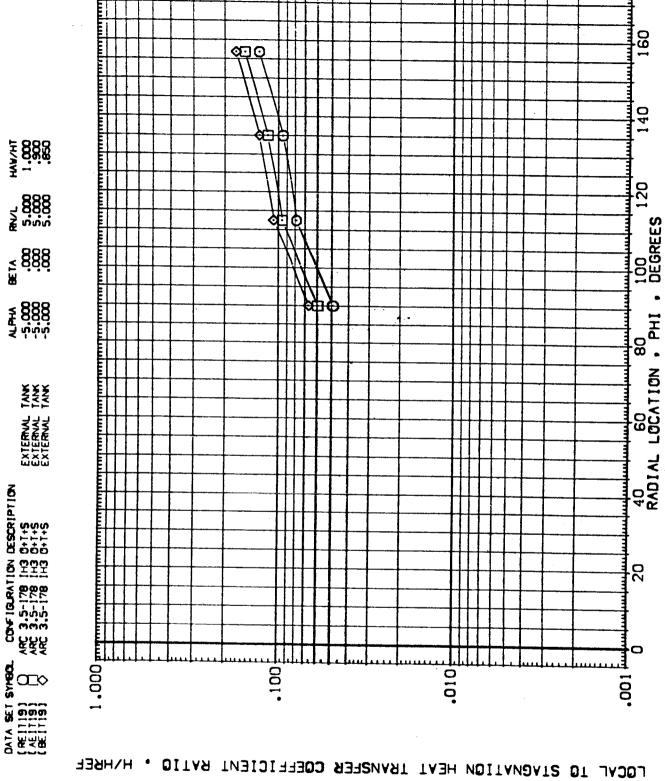




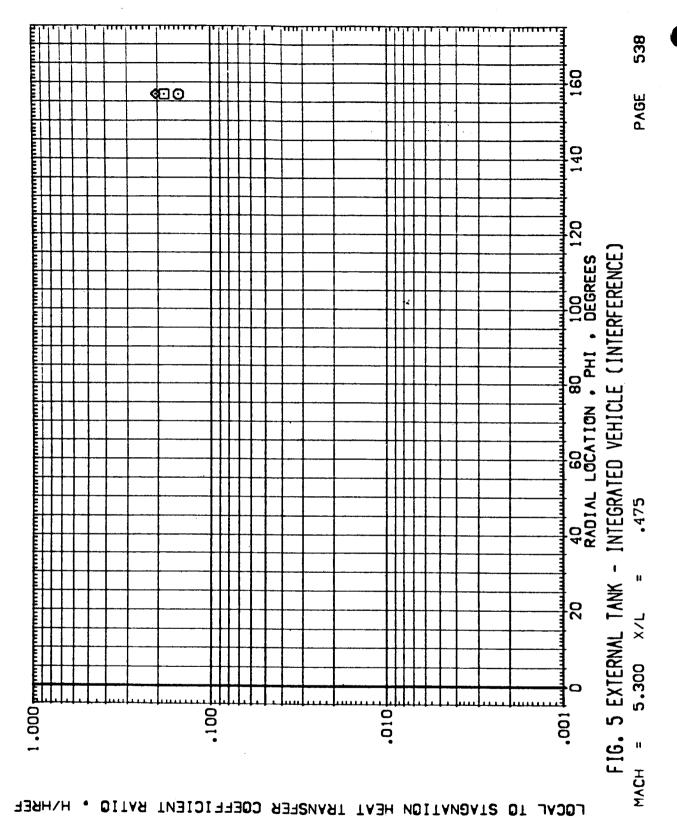
065CR1PT10N 0+1+S 0+1+S 0+1+S ARC 3.5-178 1H3 G ARC 3.5-178 1H3 G ARC 3.5-178 1H3 G ARC 3.5-178 1H3 G \mathbb{C}° DATA SET ((RE1119) (AE1119) (BE1119)





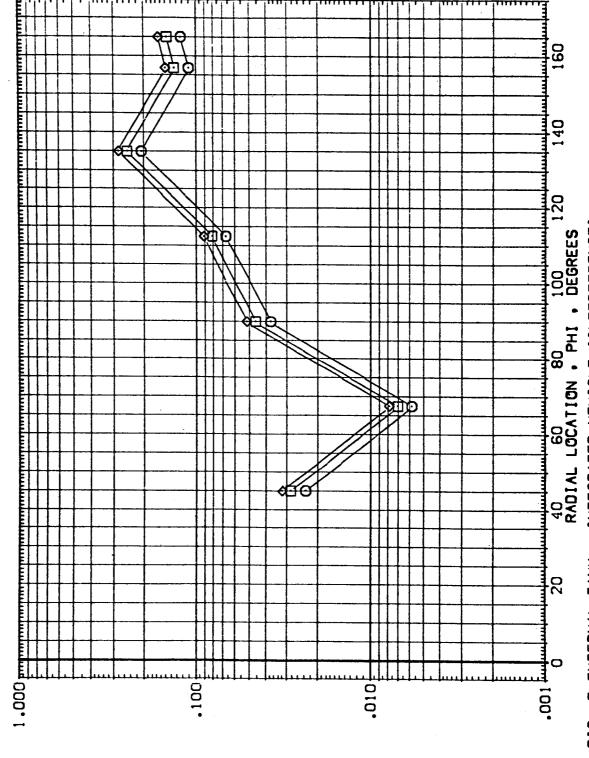


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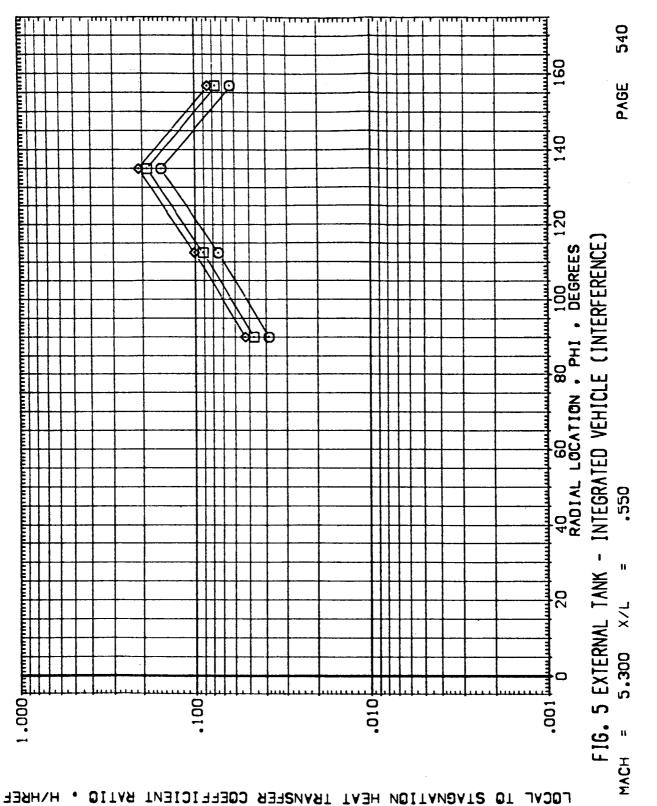






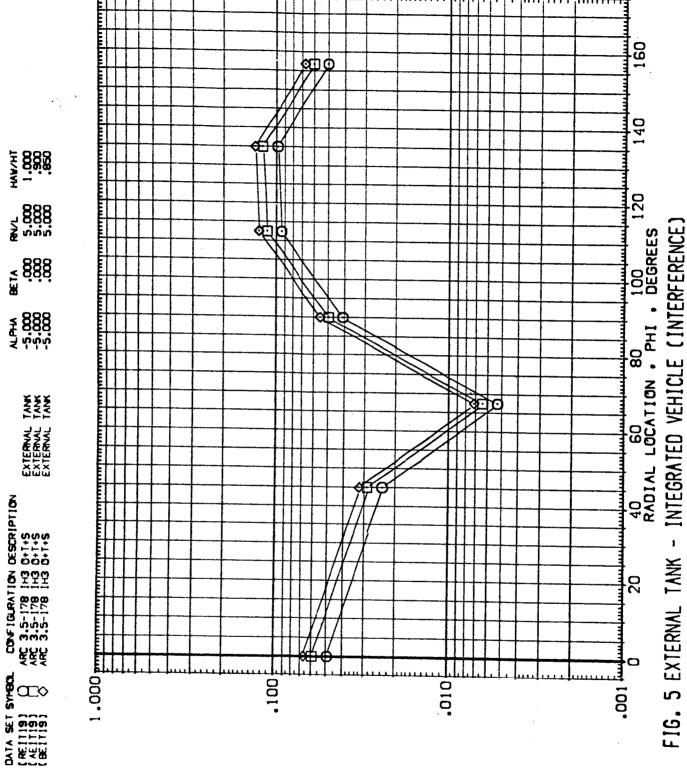
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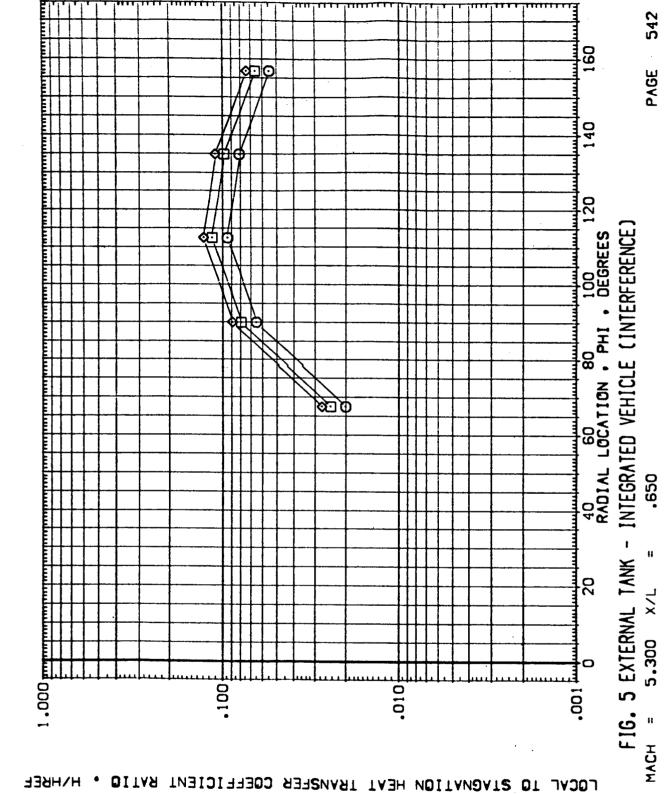


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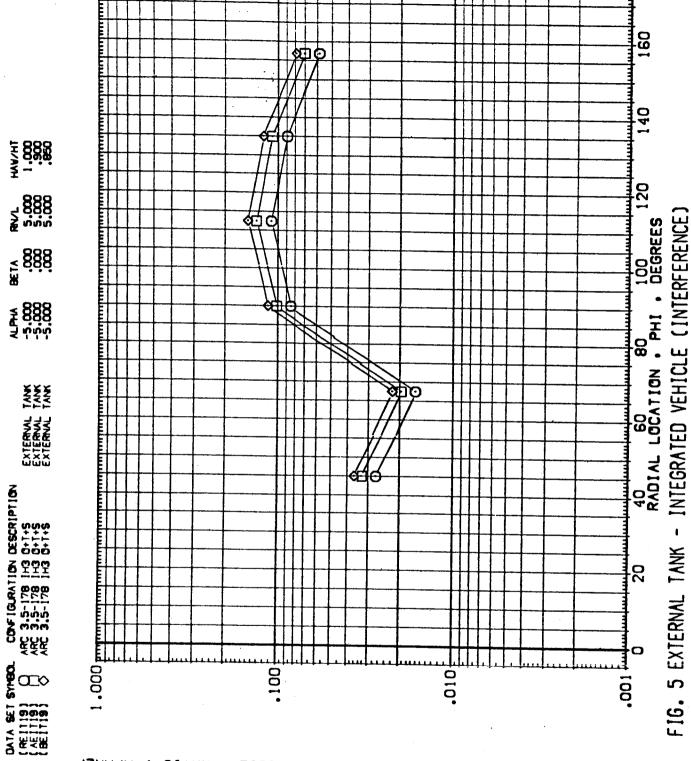
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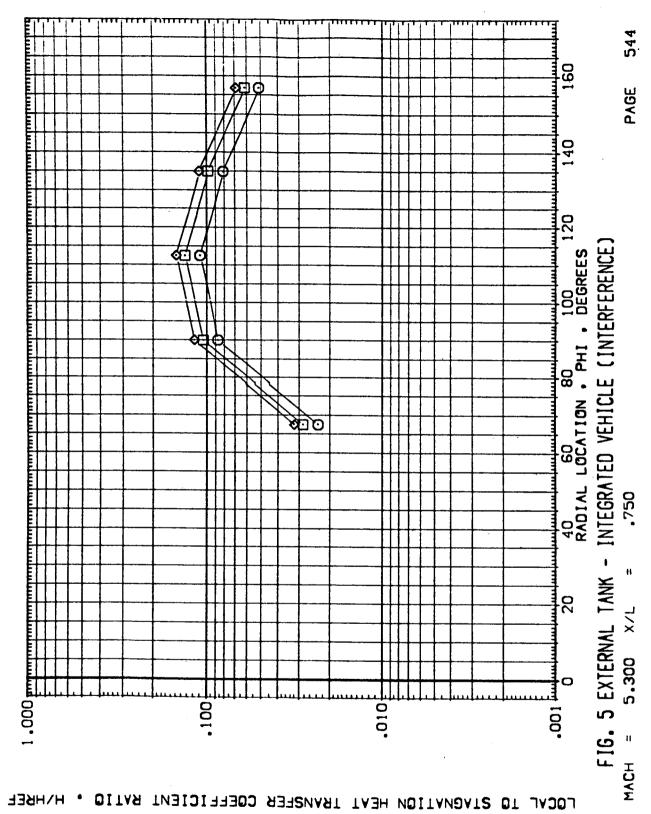






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546 PAGE 120 INTEGRATED VEHICLE (INTERFERENCE) 40 60 80 100 RADIAL LOCATION • PHI • DEGREES FIG. 5 EXTERNAL TANK -2 .100 010 .001 (AE 1119) (AE 1119) (BE 1119) MACH

LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

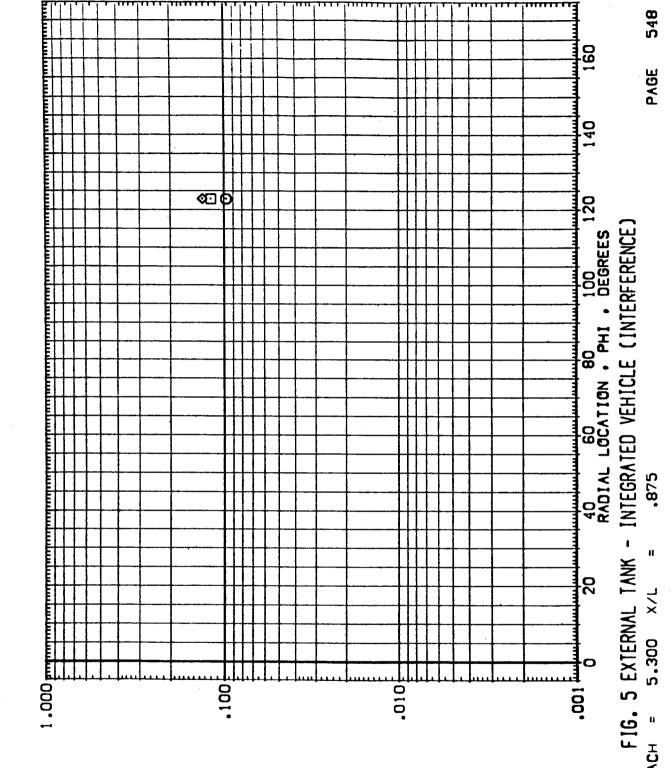


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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HARRER



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[AE1119] ARC 3.5-178 1H3 0+1+5
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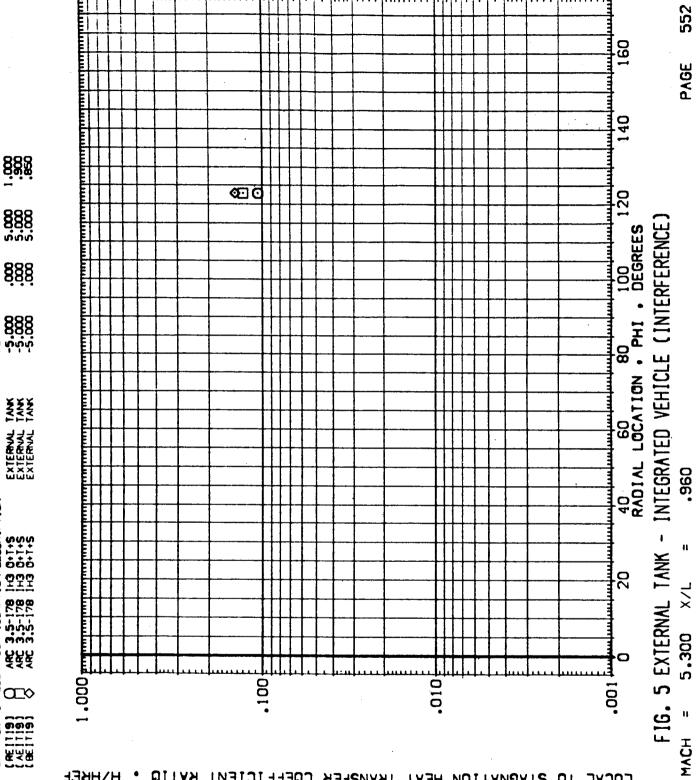
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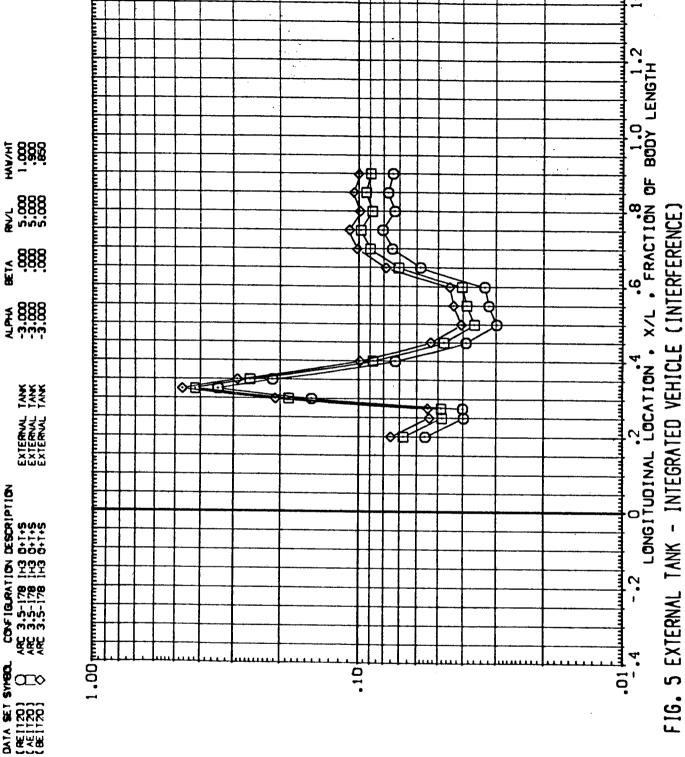
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FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) MACH =

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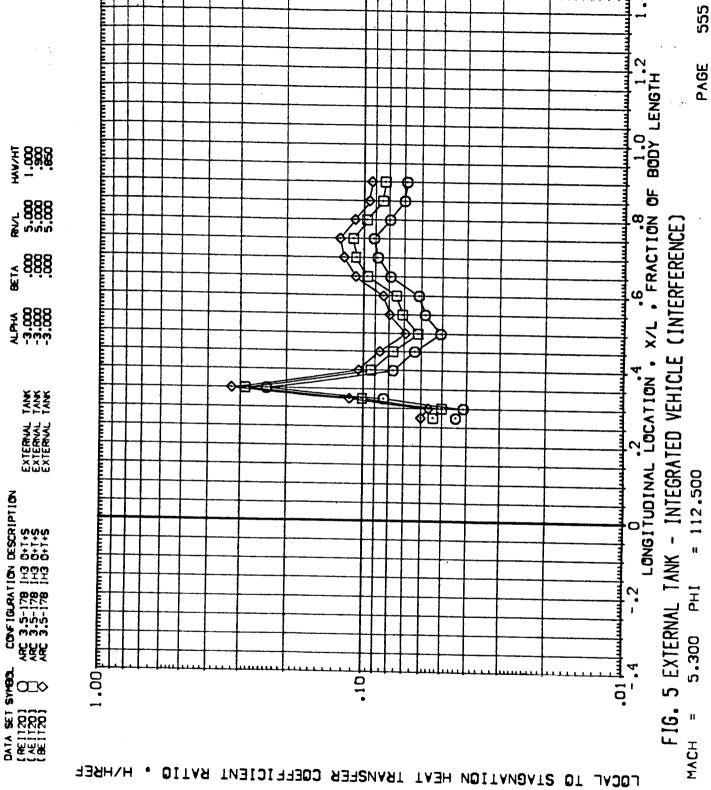


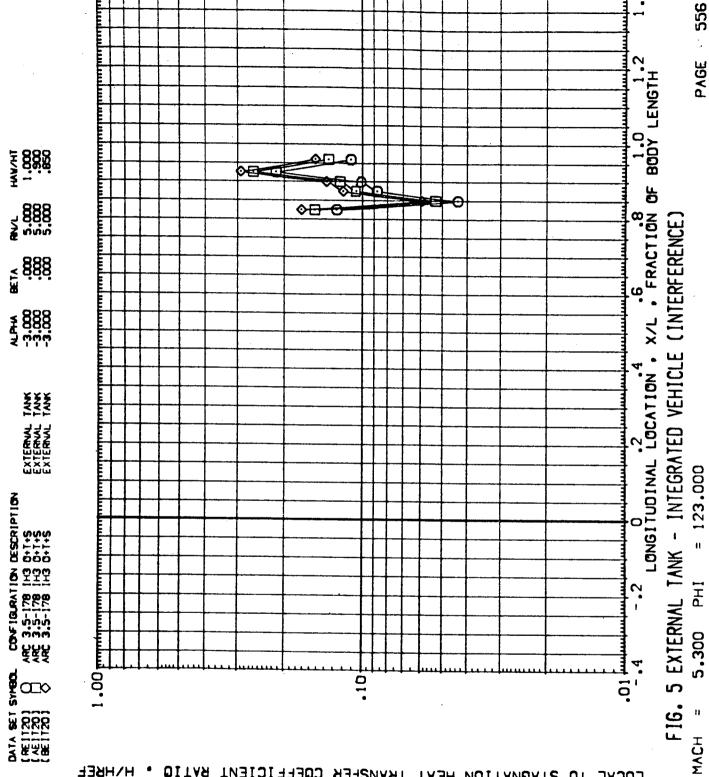
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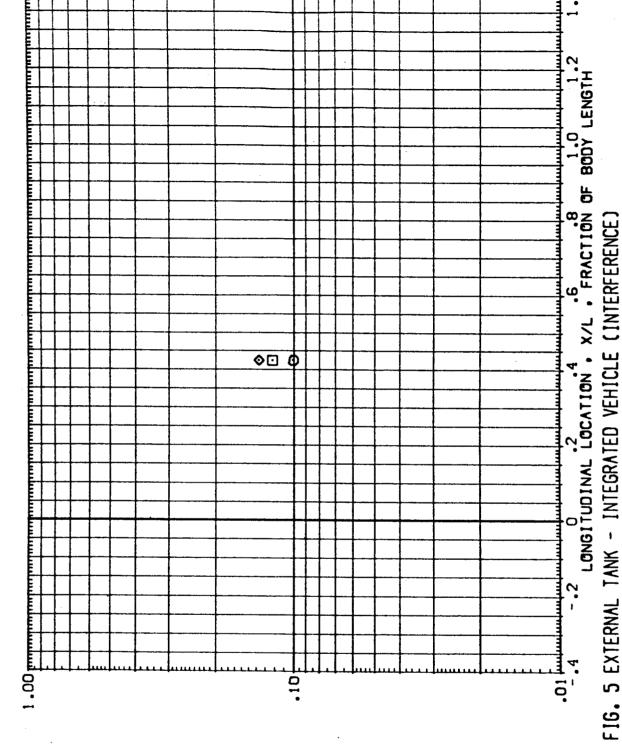
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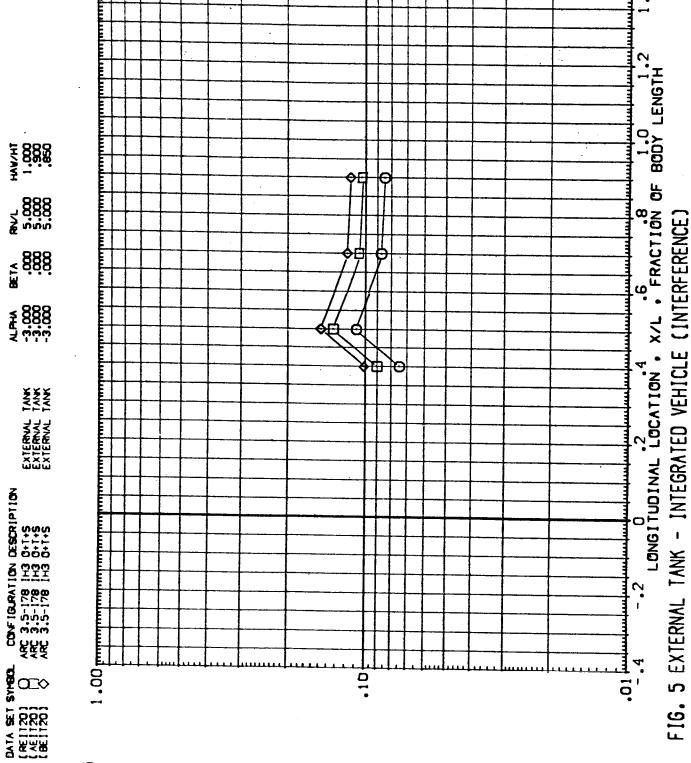
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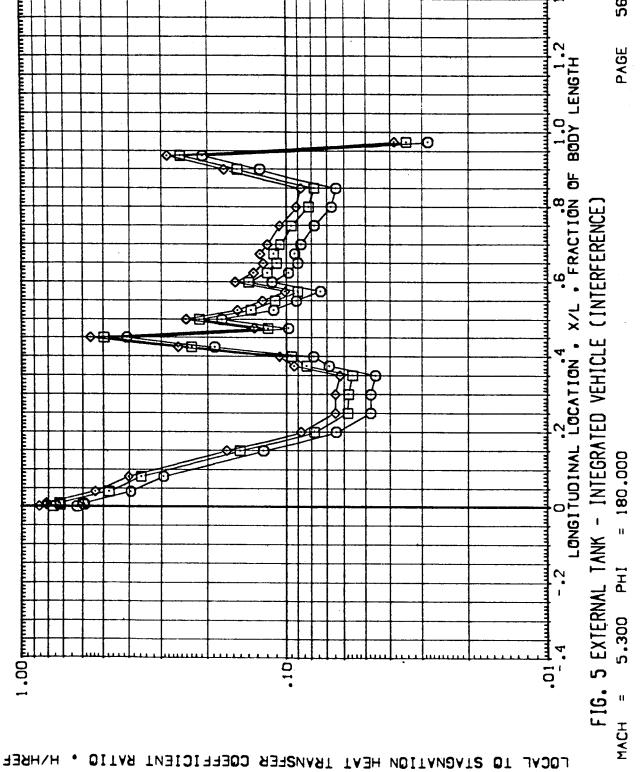
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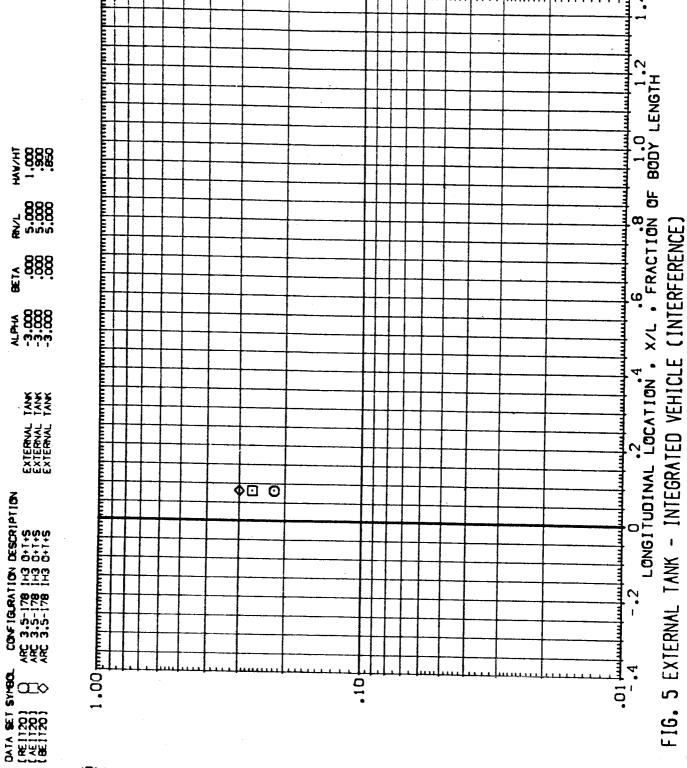




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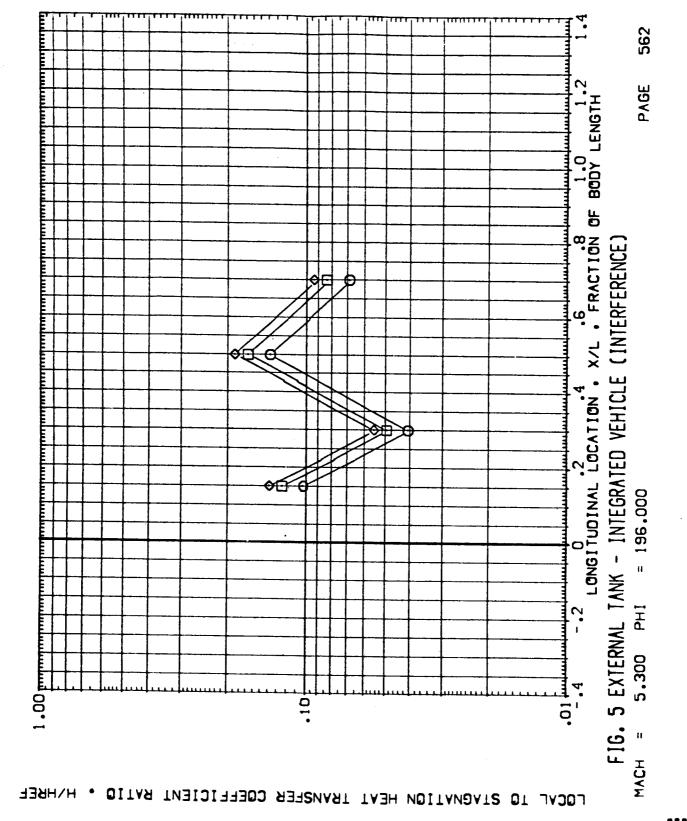
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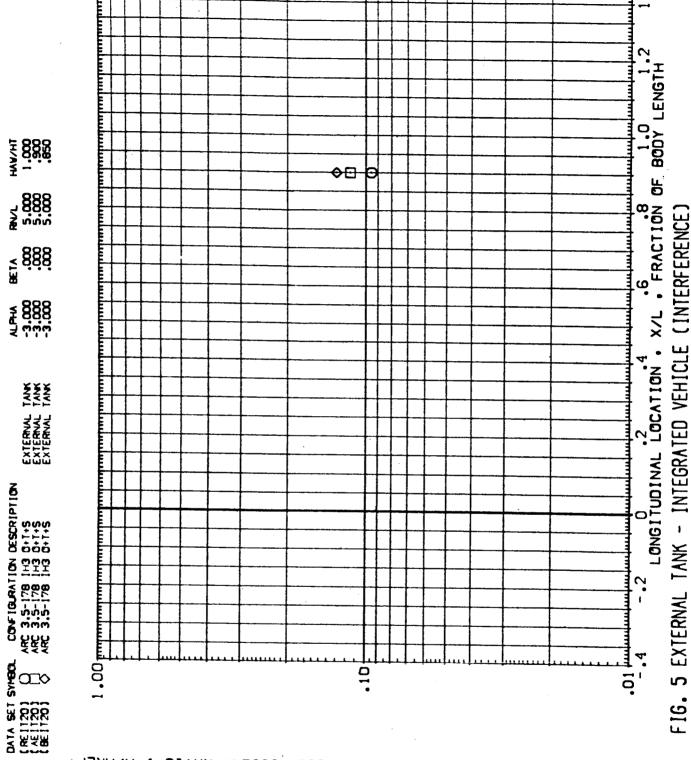


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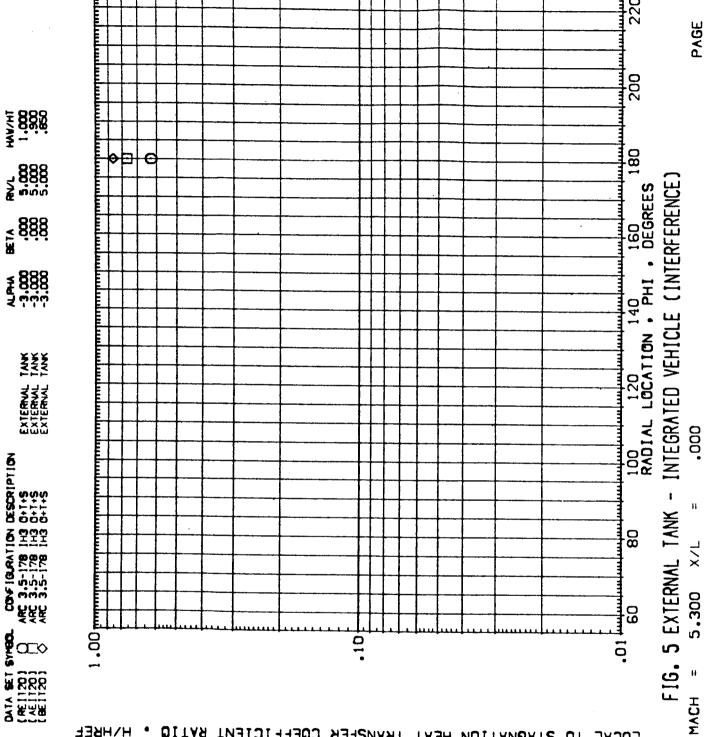
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF

FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) = 216.000 PHI 5,300 MACH

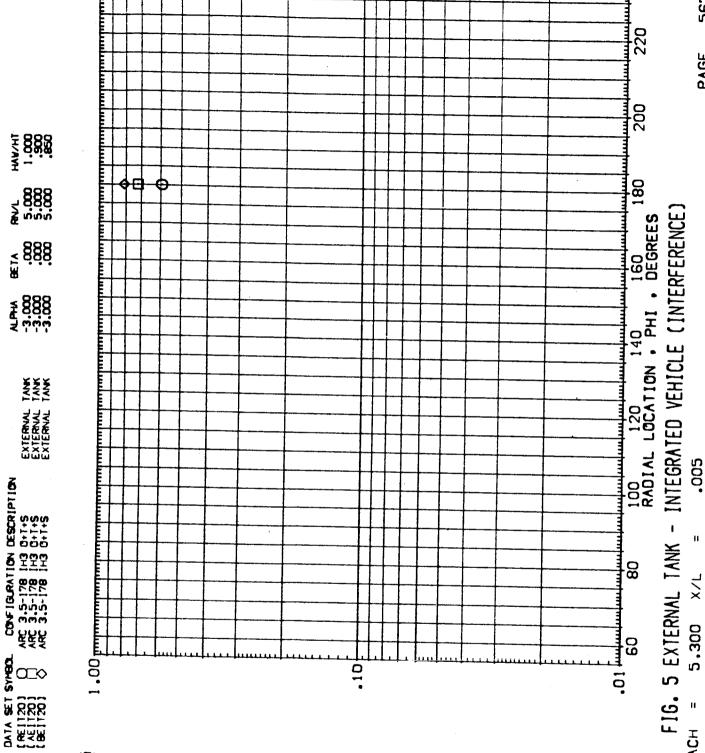
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₹ <u>టటట</u> 8889 \$ COVFIGURATION DESCRIPTION ARC 3.5-178 H3 0+15 ARC 3.5-178 H3 0+15 ARC 3.5-178 H3 0+15



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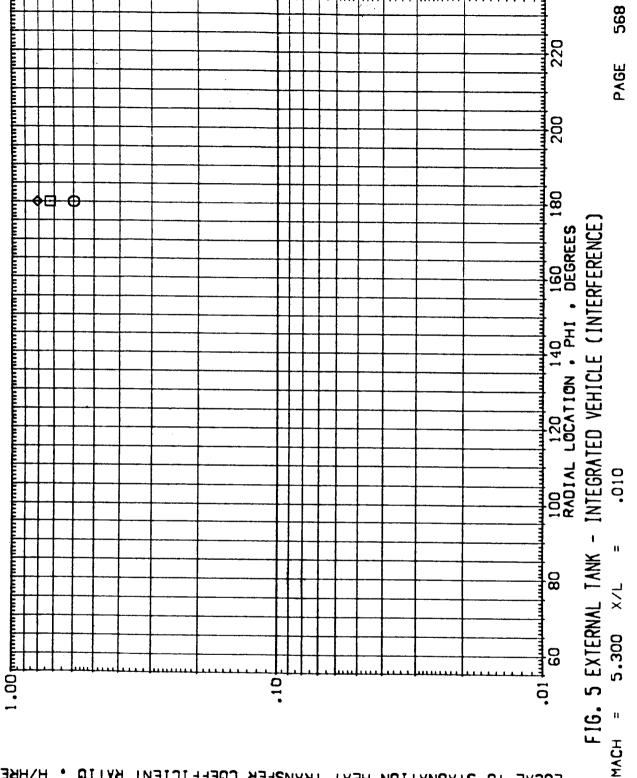




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200 180 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE: ₹ 888 888 ≜ 6.6.6. \$ 6000. EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK 1 • 00 քաղապոտրարադուդ 8 X/L 2,300 101 0 LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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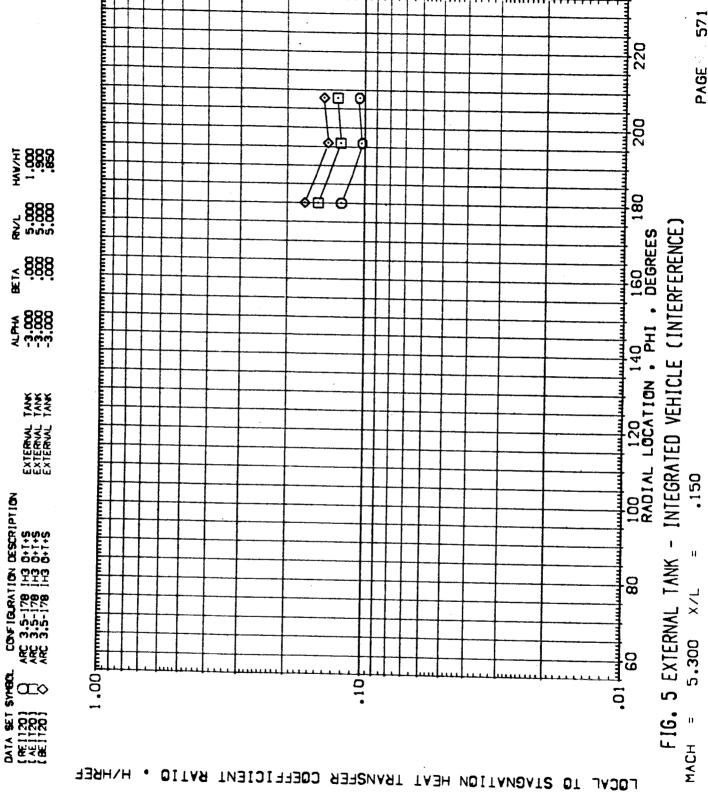
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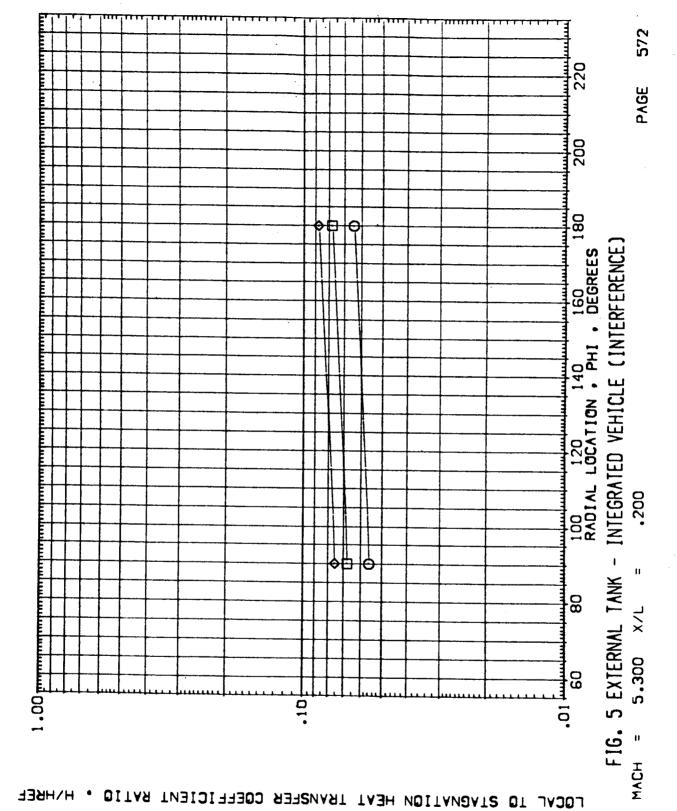
570 PAGE 表 688 688 688 180 INTEGRATED VEHICLE (INTERFERENCE) 100 120 140 160 RADIAL LOCATION , PHI , DEGREES # 8888 8888 ₹ 6.6.6. \$886. .080 CONFIGURATION DESCRIPTION ARC 3.5-178 1H3 0+15 ARC 3.5-178 1H3 0+15 ARC 3.5-178 1H3 0+15 FIG. 5 EXTERNAL TANK -× // 1 .00 քաղուպուպու 5.300 .10 <u>.</u> ∞ PATA SET (RE1120) (AE1120) (BE1120) MACH

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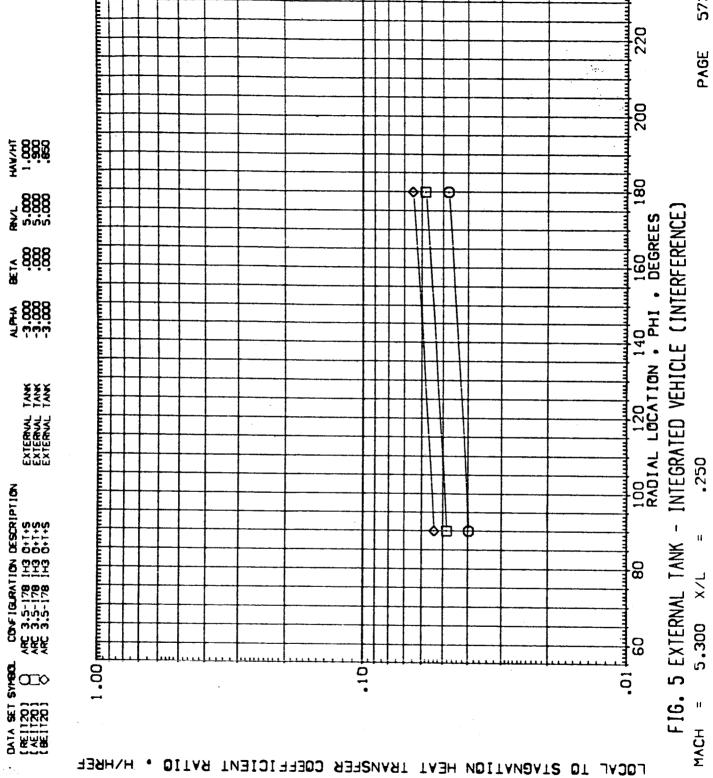




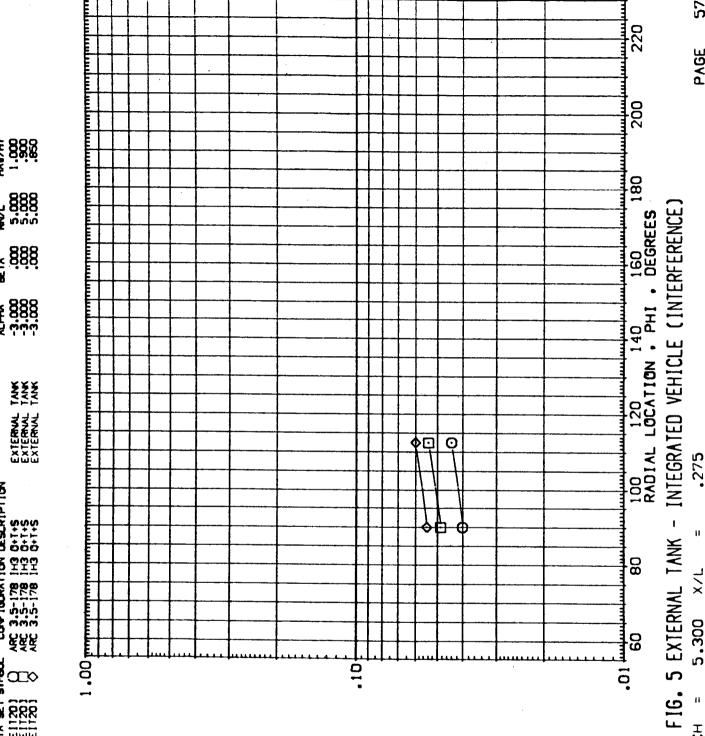
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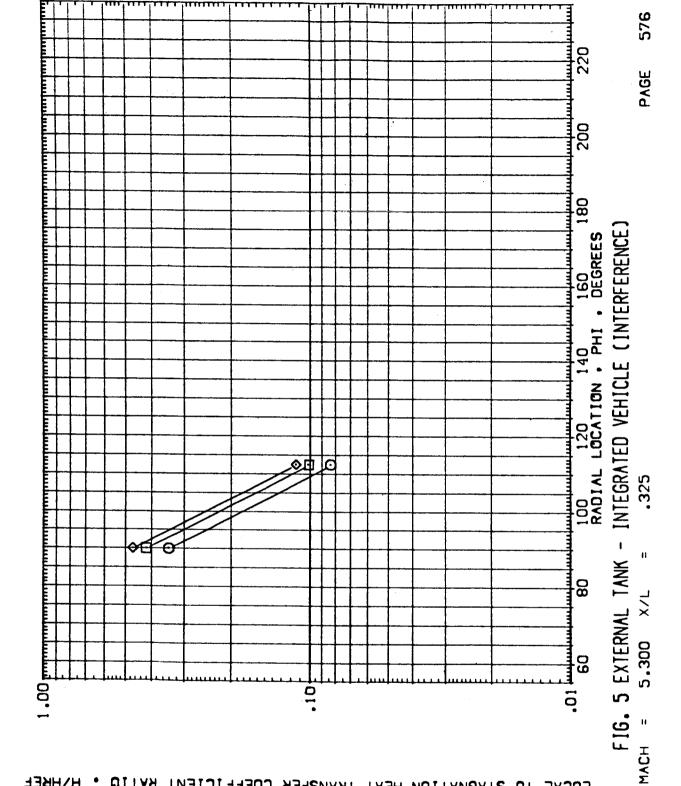
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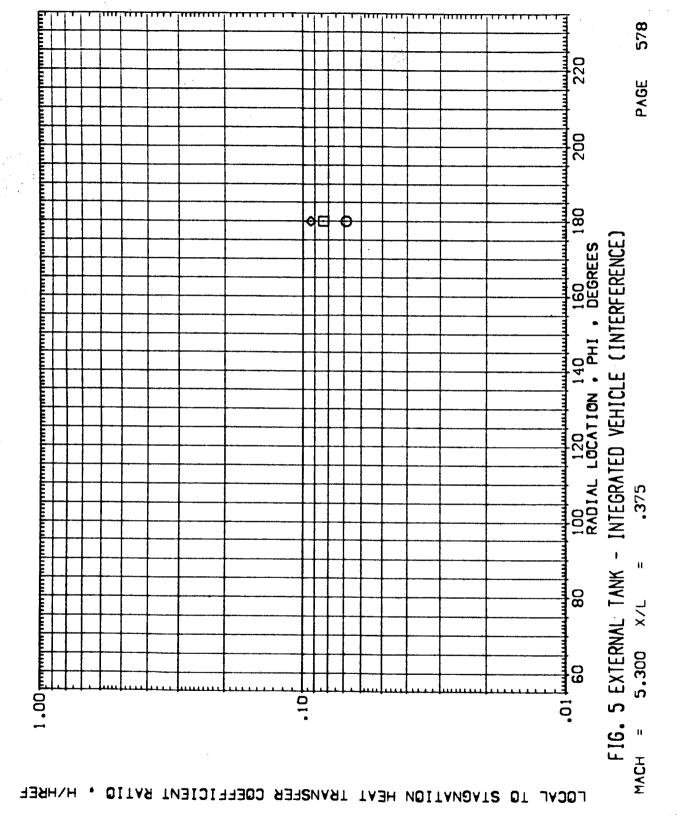
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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HVHREF



577 220 PAGE 200 180 ₹ %%° 988 888 INTEGRATED VEHICLE (INTERFERENCE) 100 120 140 160 RADIAL LOCATION • PHI • DEGREES # ₹ 888 å ö.ö.ü. ₹ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK Q **⊘**□ .350 CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 ARC 3.5-178 H3 0+1+5 ARC 3.5-178 H3 0+1+5 FIG. 5 EXTERNAL TANK -1 •00 բողորդուդուդուդուդուդ 8 X X/L 5,300 10. PATA SET SYMBOL (ME1720) 01. MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF

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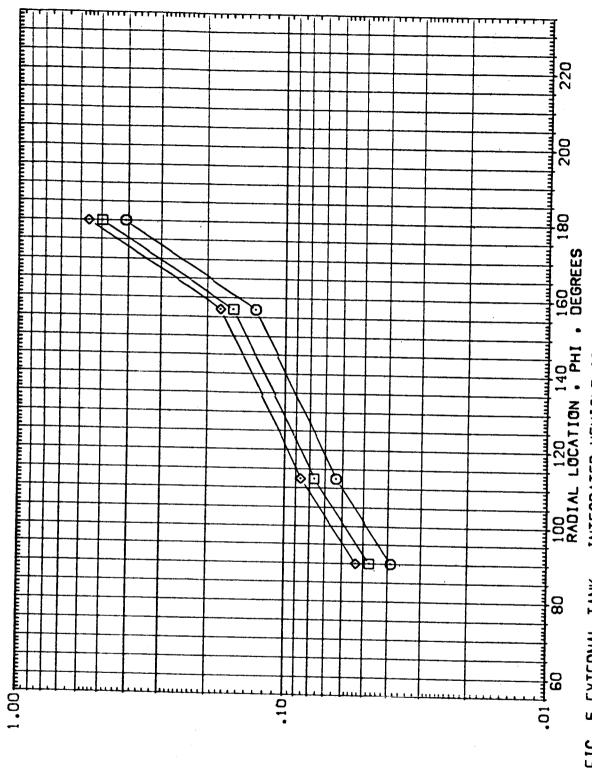
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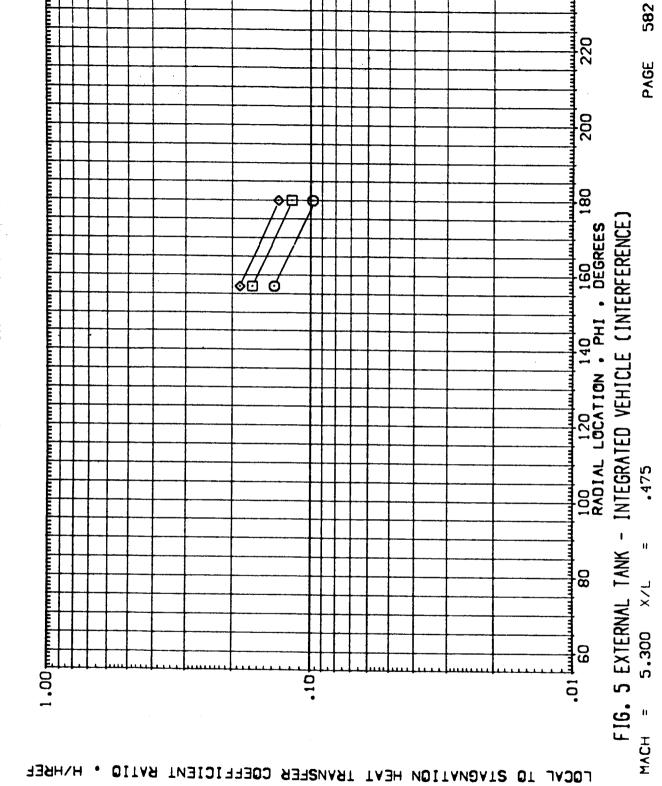
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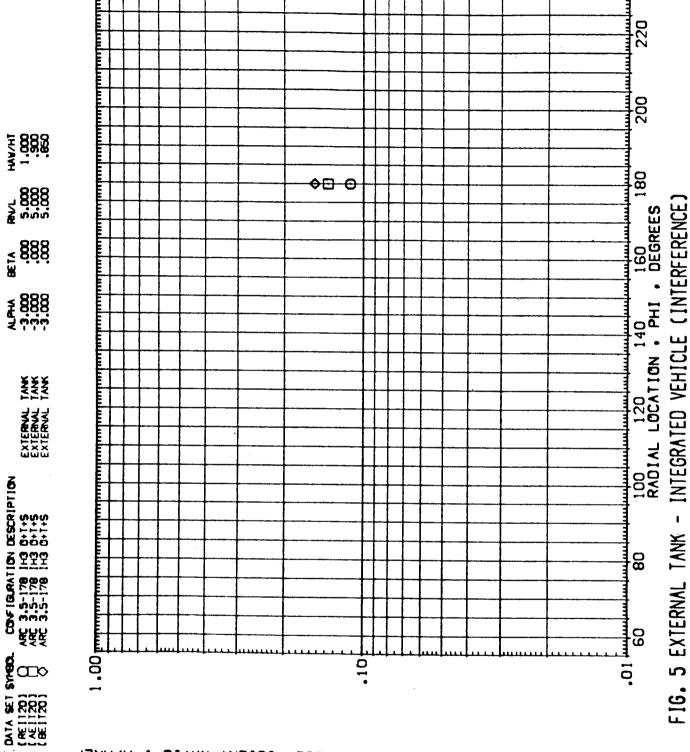
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583 PAGE $\odot \square$ 0 1.000 1.000 1.000 1.000 1.000 180 \$ 0.00 \$ 988 988 INTEGRATED VEHICLE (INTERFERENCE) 100 120 140 160 RADIAL LOCATION • PHI • DEGREES # 888 888 ₹ 6.6.6. 8886. EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK .500 CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+15 ARC 3.5-178 H3 0+15 ARC 3.5-178 H3 0+15 FIG. 5 EXTERNAL TANK -1 •00 բուդուդուդուդուդուդ **Ø**Д ठ 10. PATA RET SYMBOL (ARE) 1280 CO. (C. M. 1780 CO. 01. MACH LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO

₹ -888 888 \$ www 7 888 888 ₹ 888 888 Ž 688 ¥ 888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 H3 0+1+5 ARC 3.5-178 H3 0+1+5 ARC 3.5-178 H3 0+1+5



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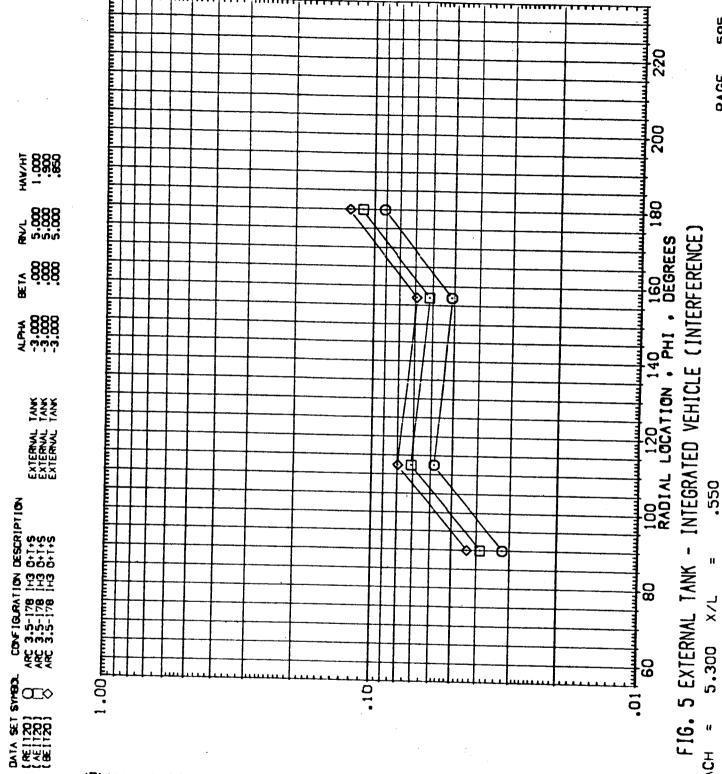
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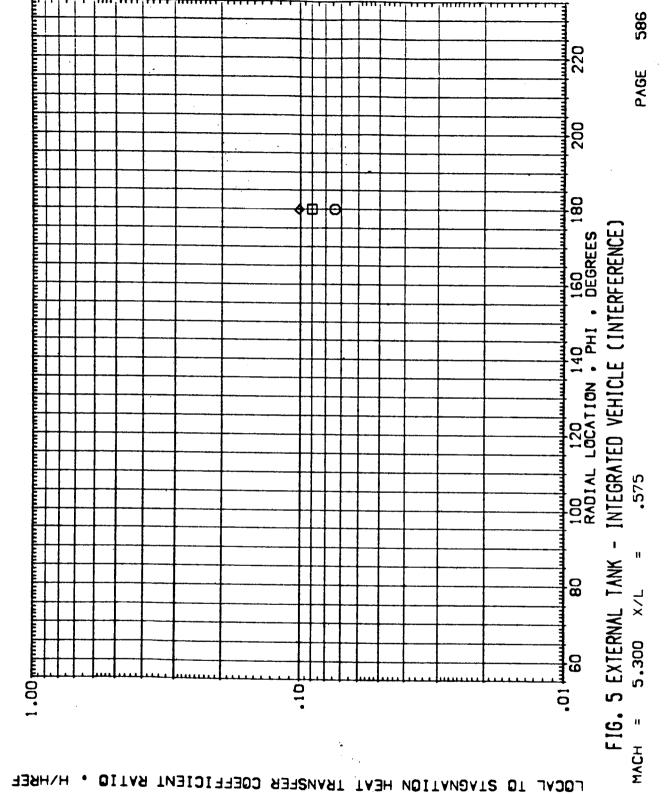
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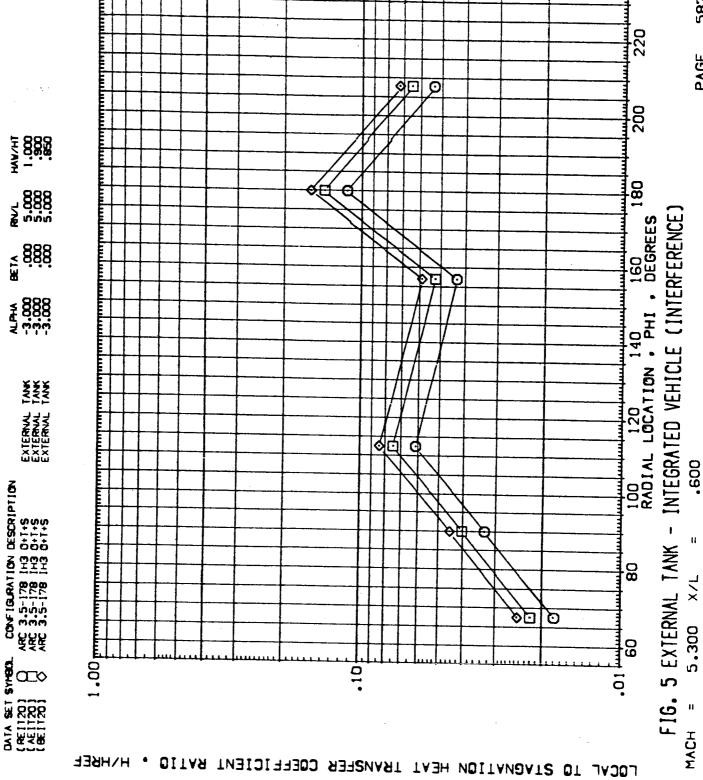


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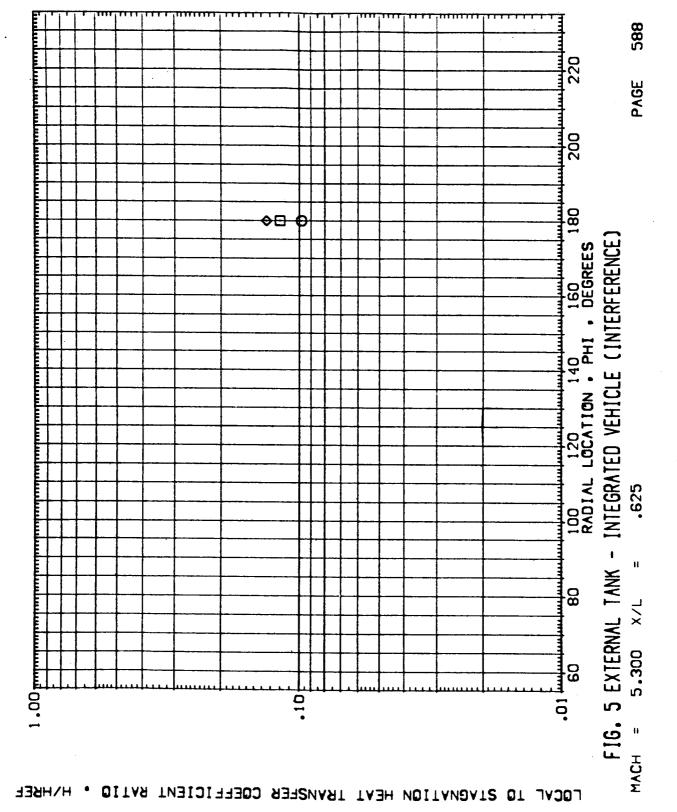
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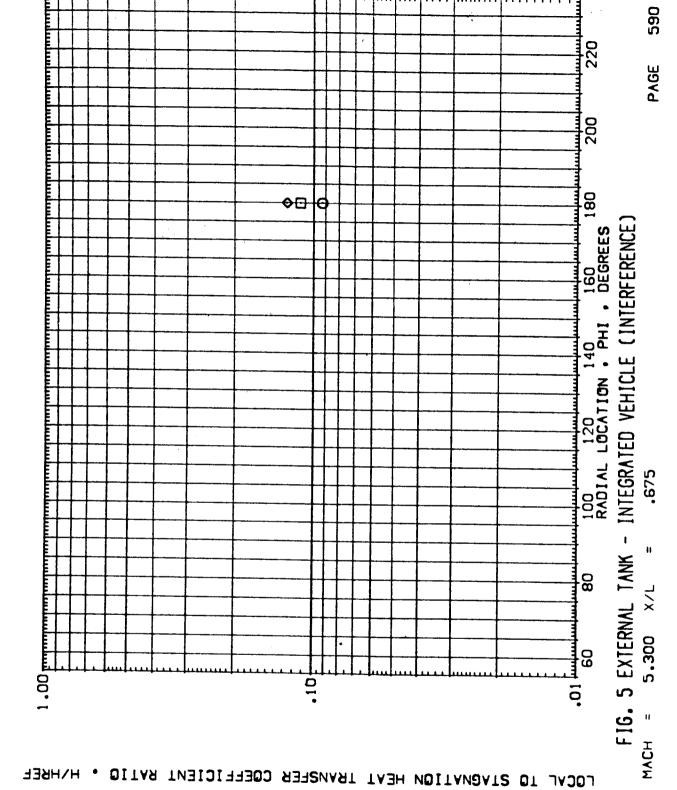


8886 8886 ₹ 6.6.6. \$ 6886. EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 SYMBOL DATA SET (RE1120) (AE1120) (BE1120)

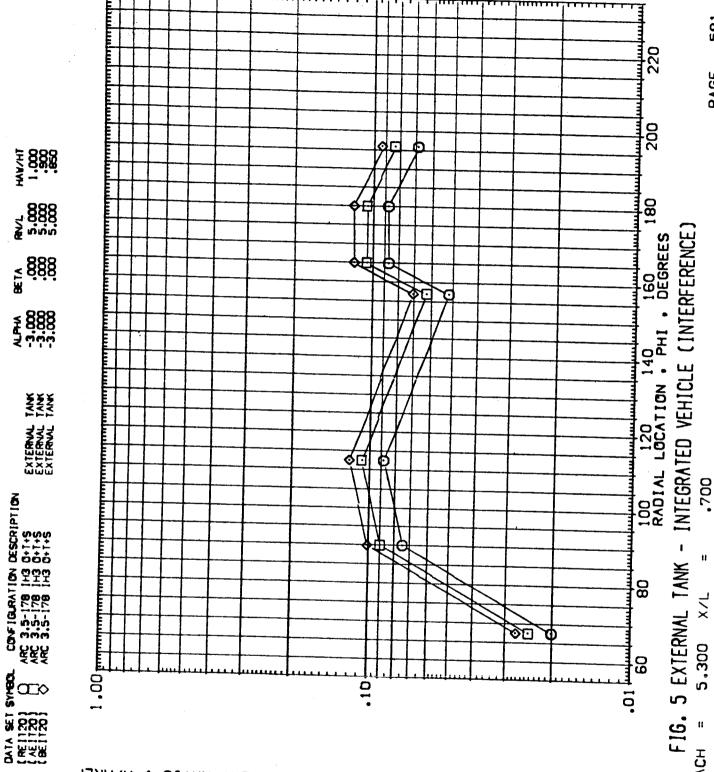




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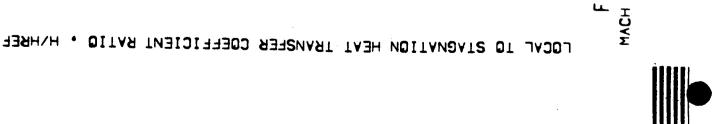


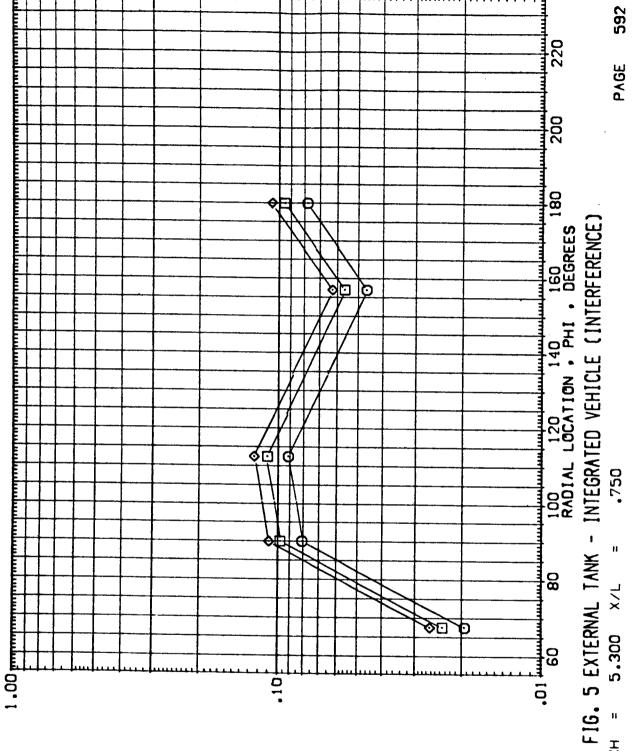




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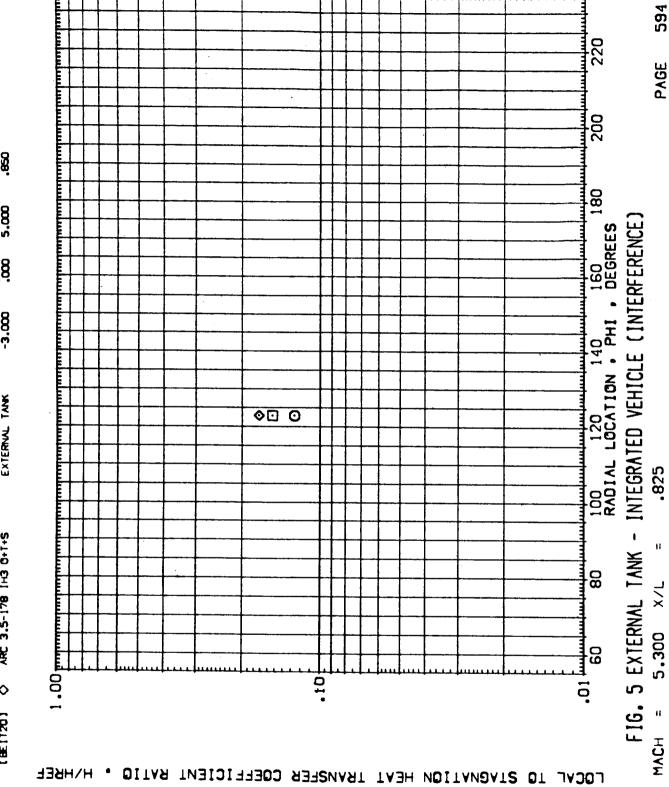
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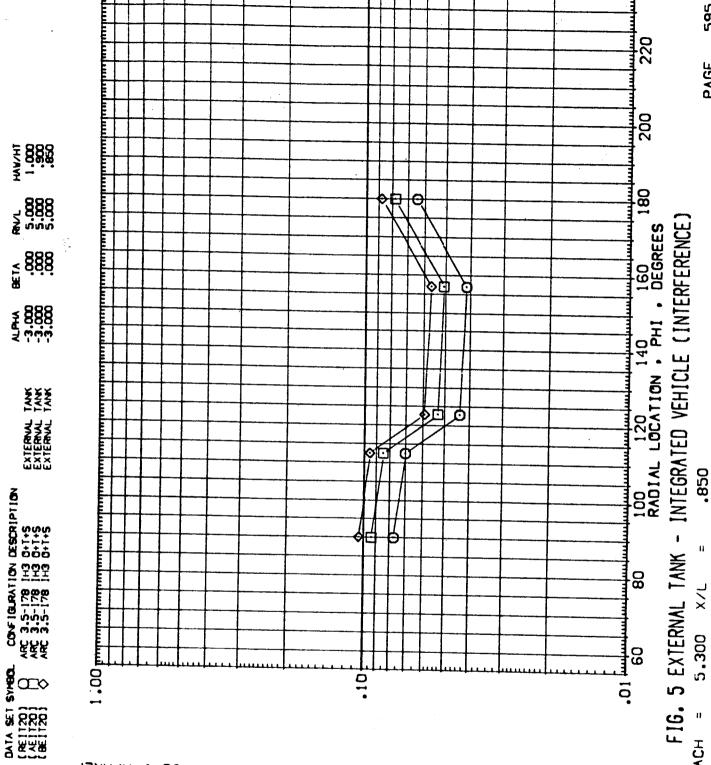




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₹ ოოო 988 988 # 8888 8888 Å 4.4.4. 1888 1888 1888 EXTERNAL TANK EXTERNAL TANK EXTERNAL TANK CONFIGURATION DESCRIPTION ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 ARC 3.5-178 IH3 0+1+5 0ATA SET SYNBO. (AE.1723) (AE.1723) (BE.1723)

596 PAGE 180 FIG. 5 EXTERNAL TANK - INTEGRATED VEHICLE (INTERFERENCE) 100 120 140 160 RADIAL LOCATION . PHI . DEGREES ♦□ þ .875 1 • 00 բուրարարարարարայ 8 ×// 5.300 <u>.</u> MACH =

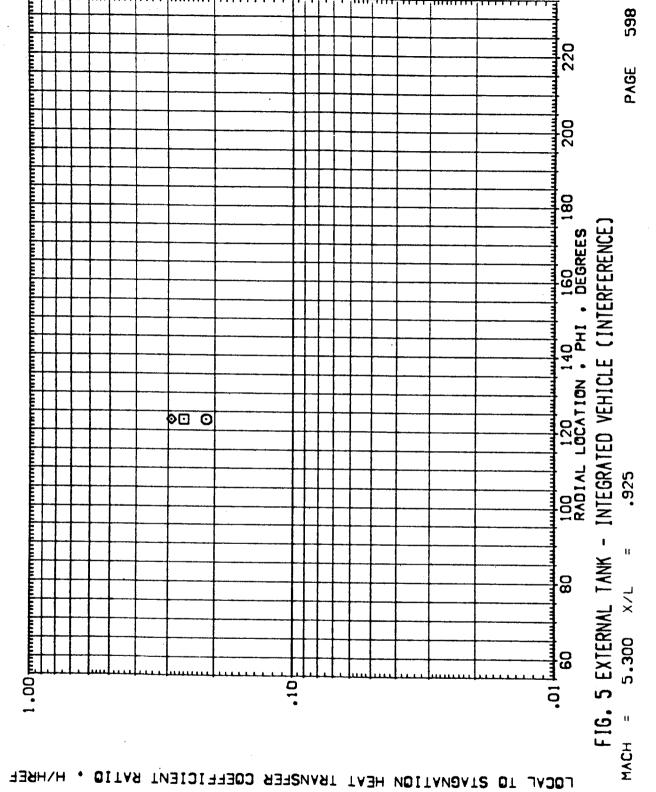
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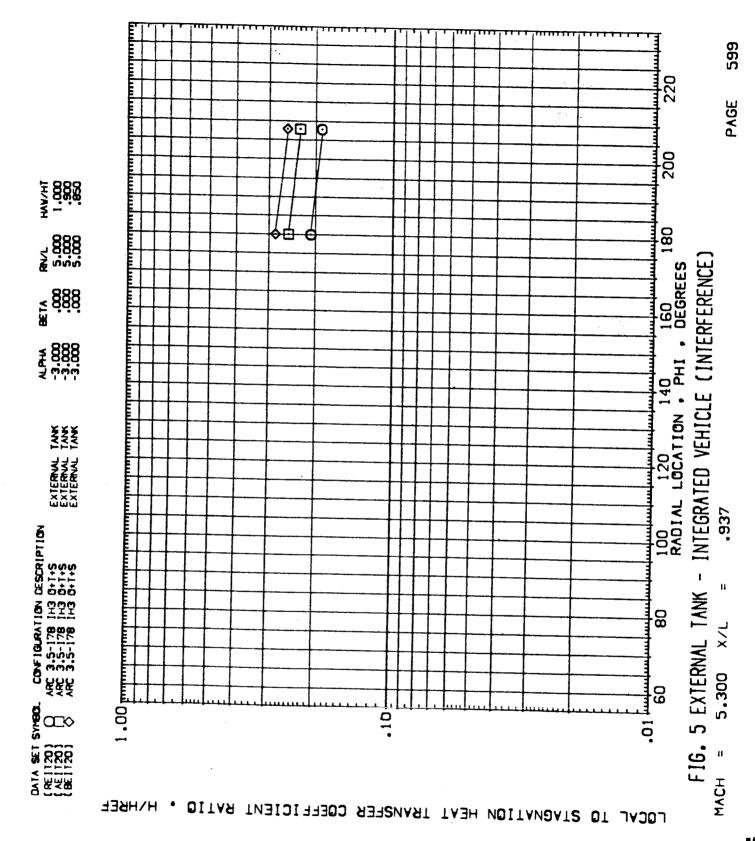


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LOCAL TO STAGNATION HEAT TRANSFER COEFFICIENT RATIO . HAHREF



INTEGRATED VEHICLE (INTERFERENCE) .960 FIG. 5 EXTERNAL TANK -5.300 ×/L MACH

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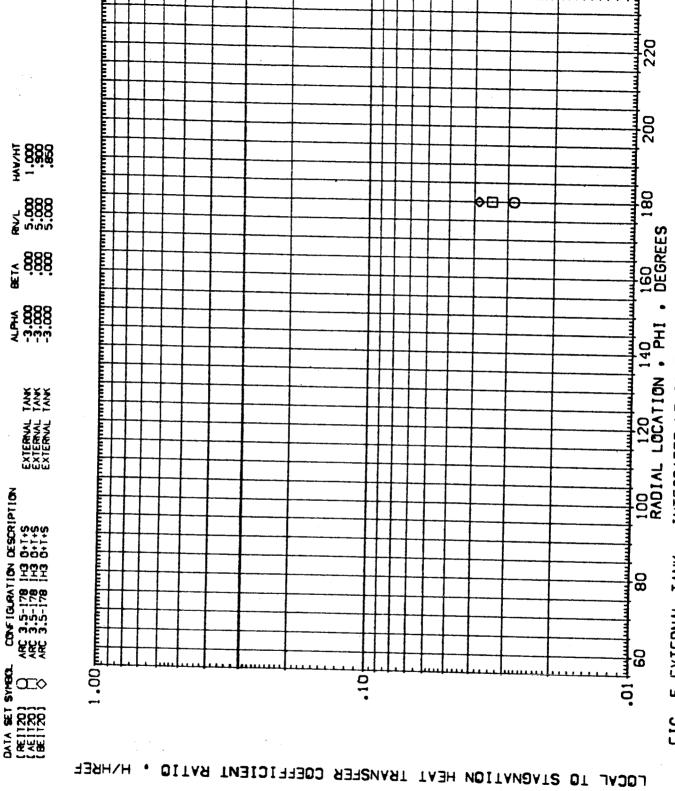
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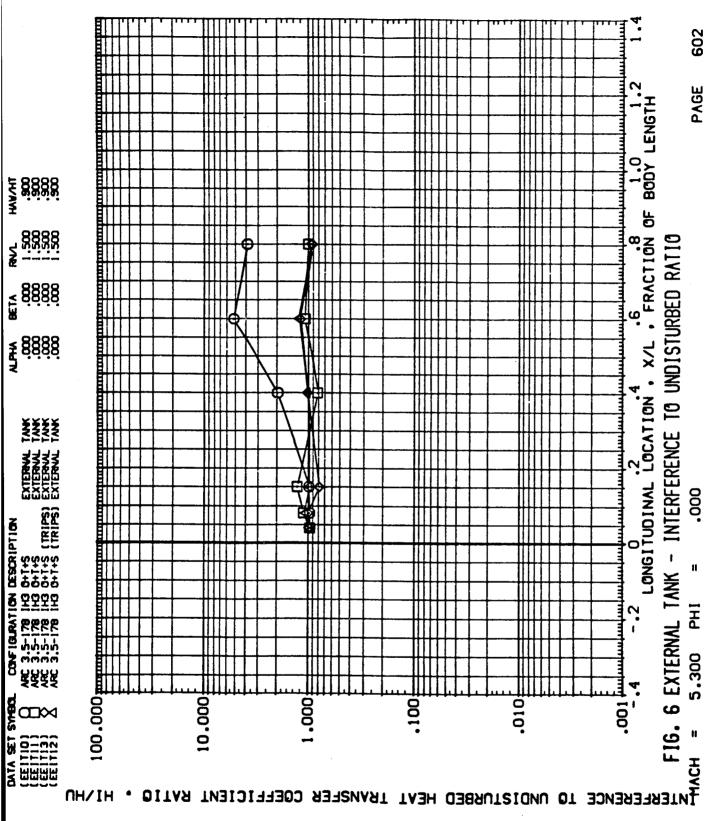
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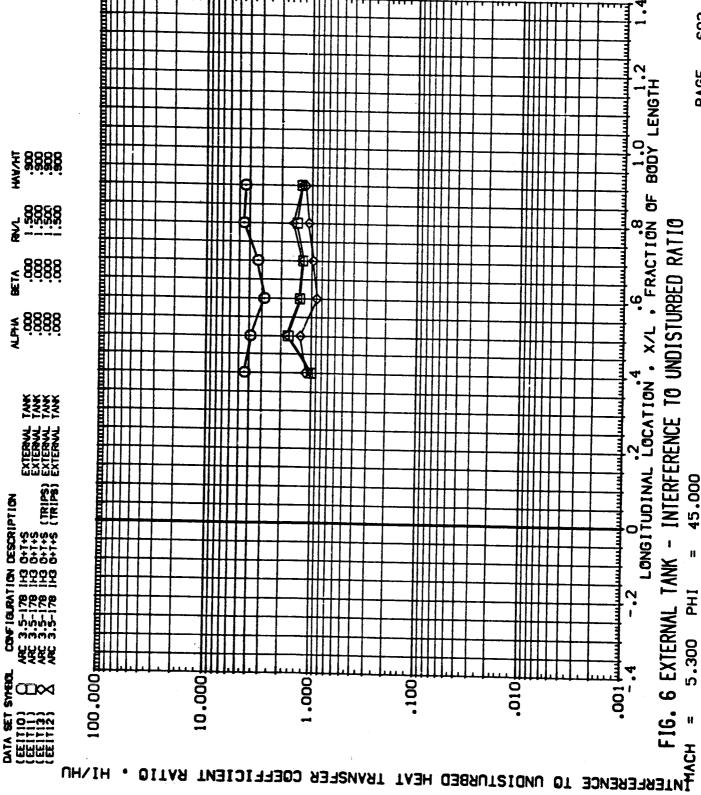
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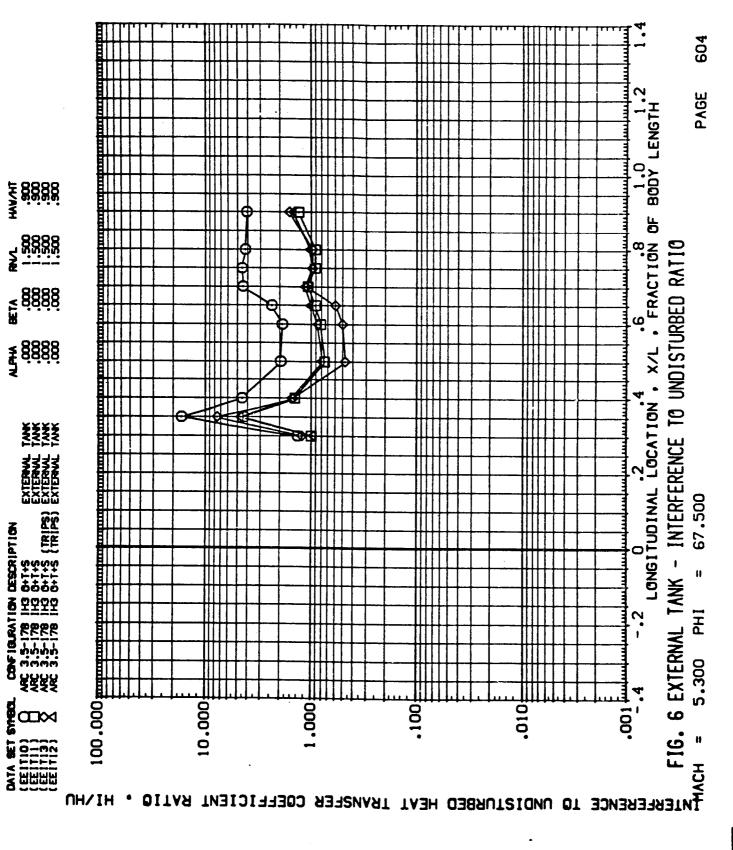
041+5 041+5 041+5 041+5 041+5 (TRIPS) E 041+5 (TRIPS) E

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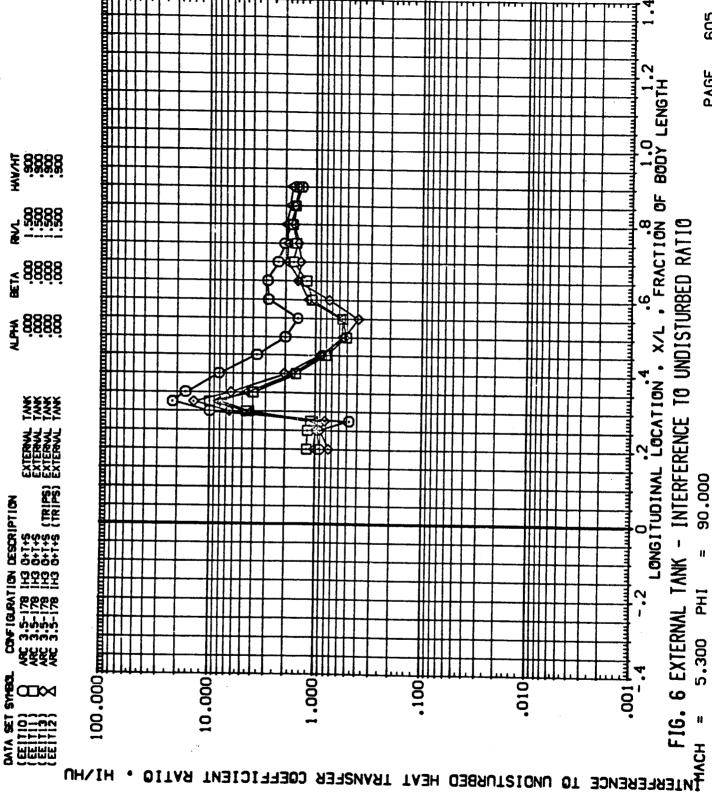
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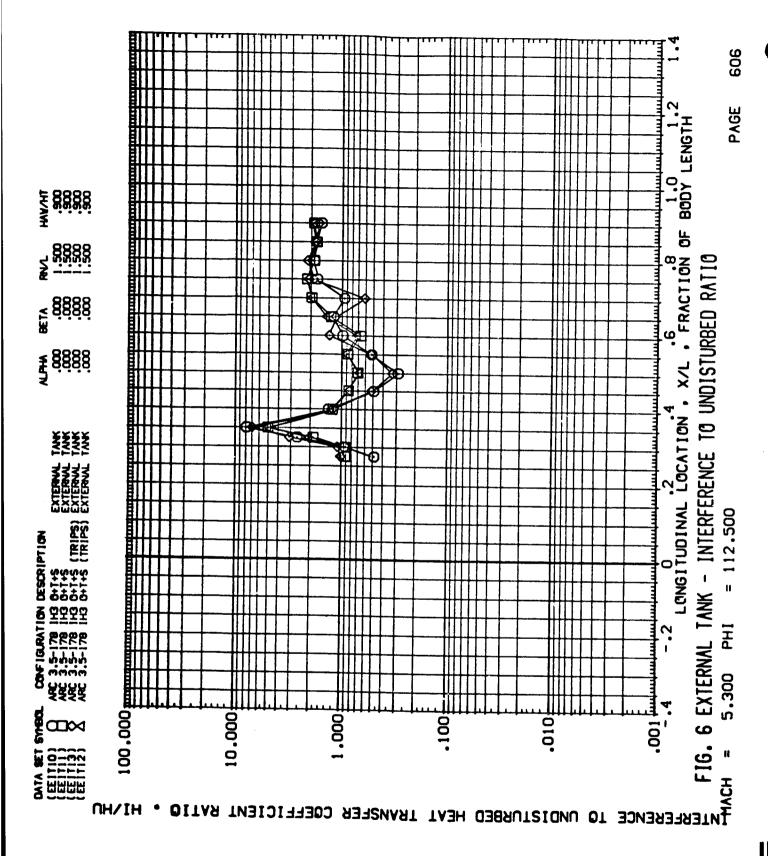




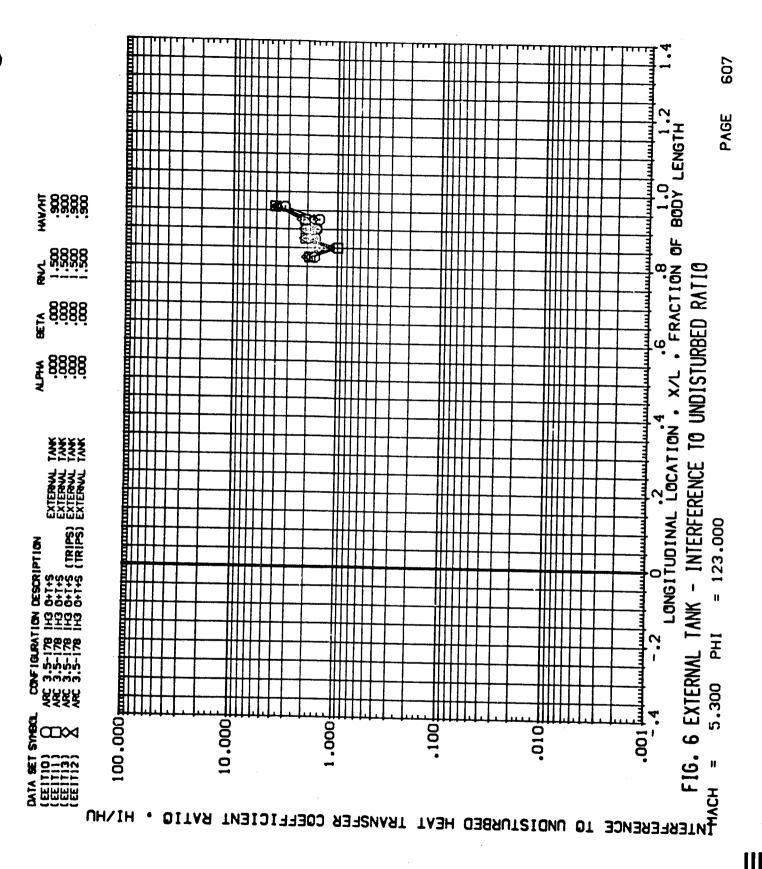






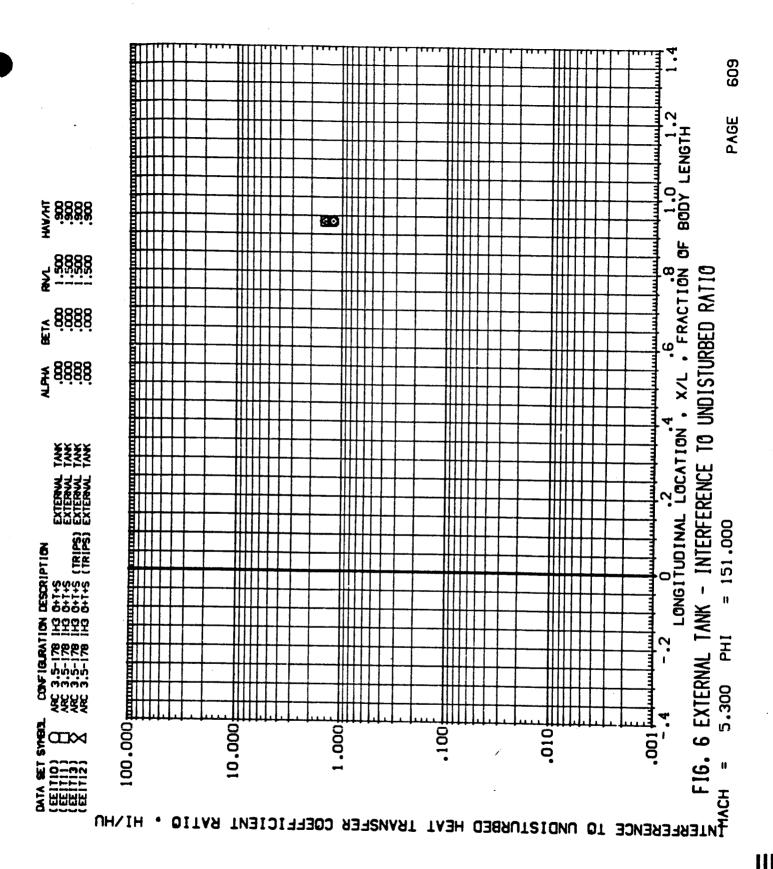


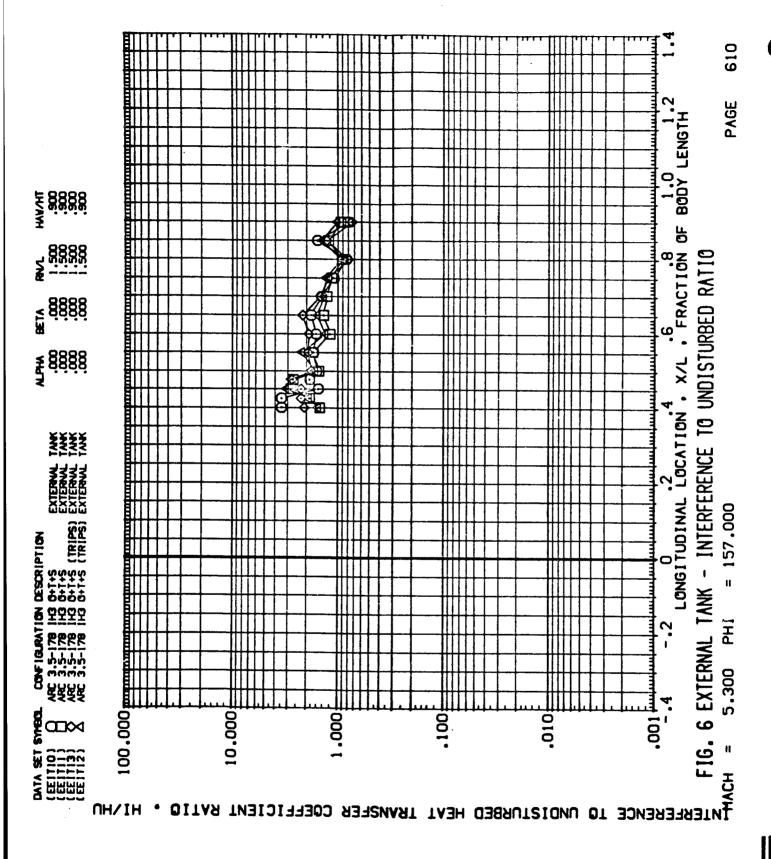




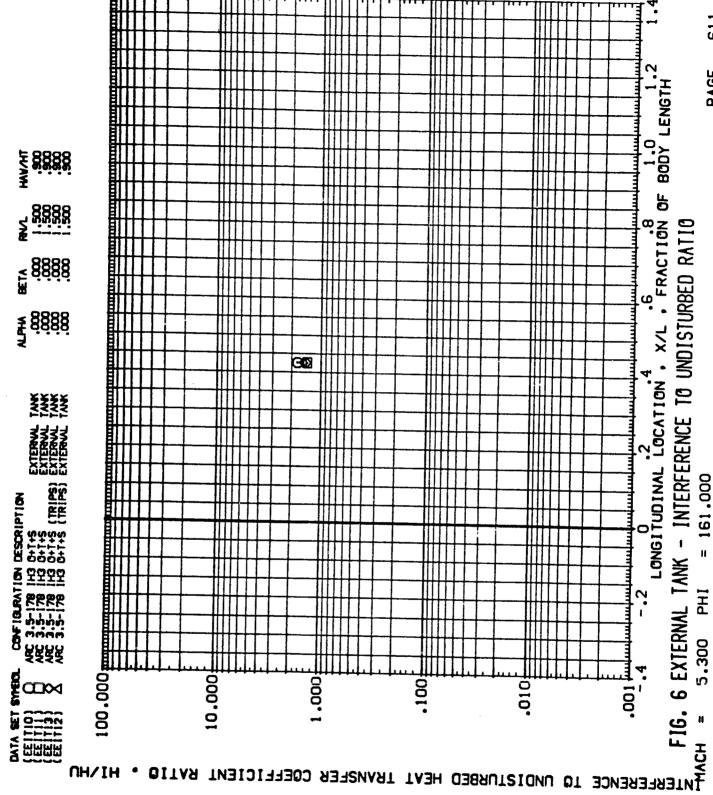
809 PAGE OF BODY LENGTH LONGITUDINAL LOCATION 4 X/L . FRACTION INK - INTERFERENCE TO UNDISTURBED RATIO ₹ 88888 ¥¥¥¥ 041+5 041+5 041+5 041+5 041+5 (TRIPS) 100.000 FIG. 6 EXTERNAL TANK ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3.5-178 IF ARC 3. 5.300 CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETION CEETIO 10.000 010 1.000 LATERERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT RATIO . HIVHU $\frac{\lambda}{10}$

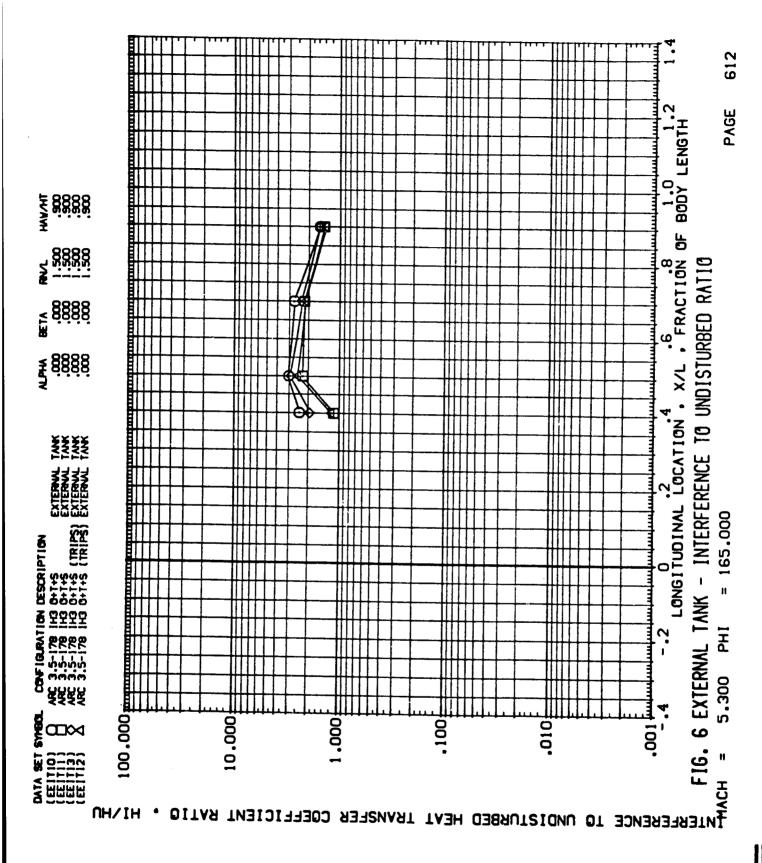




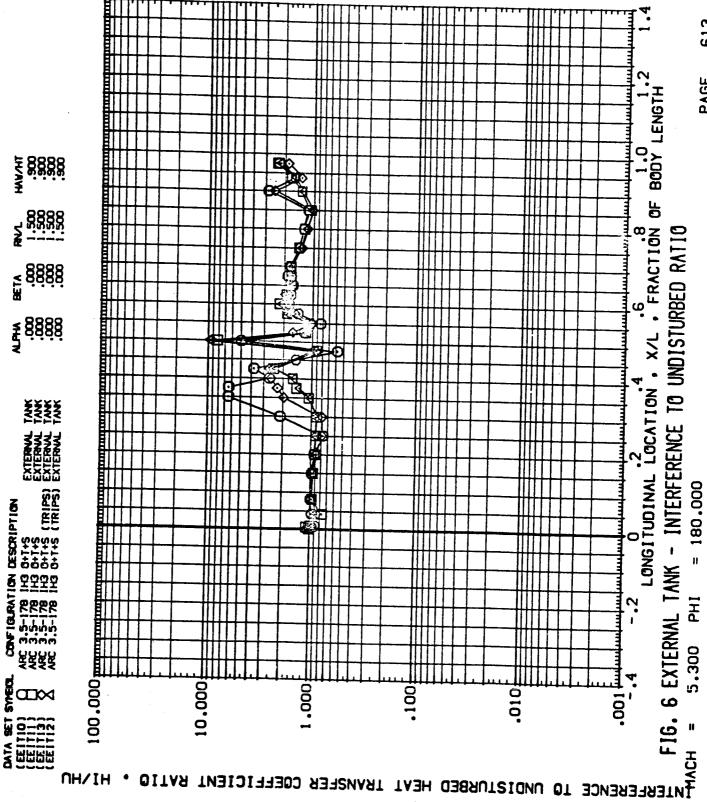


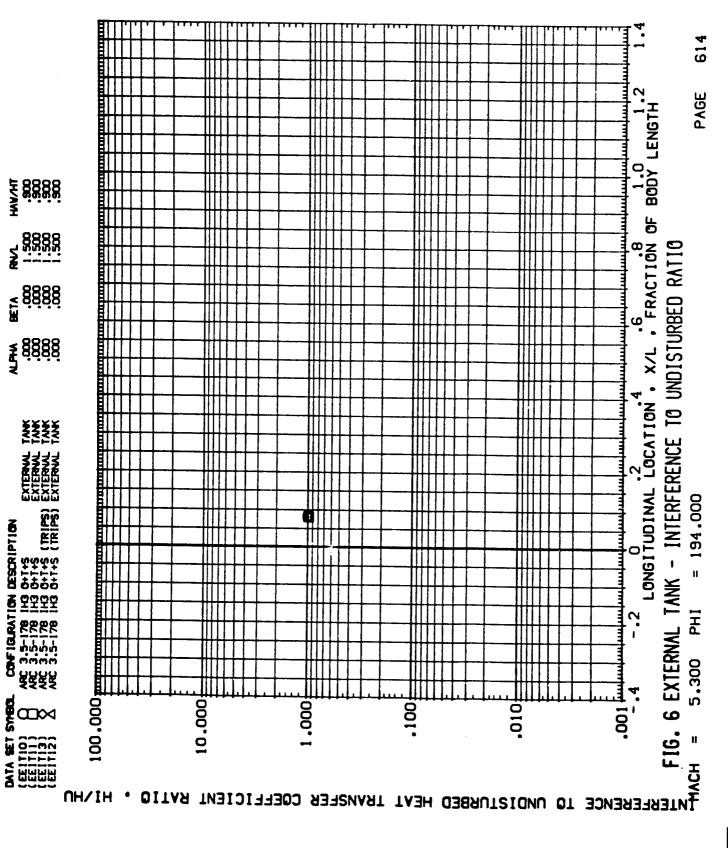




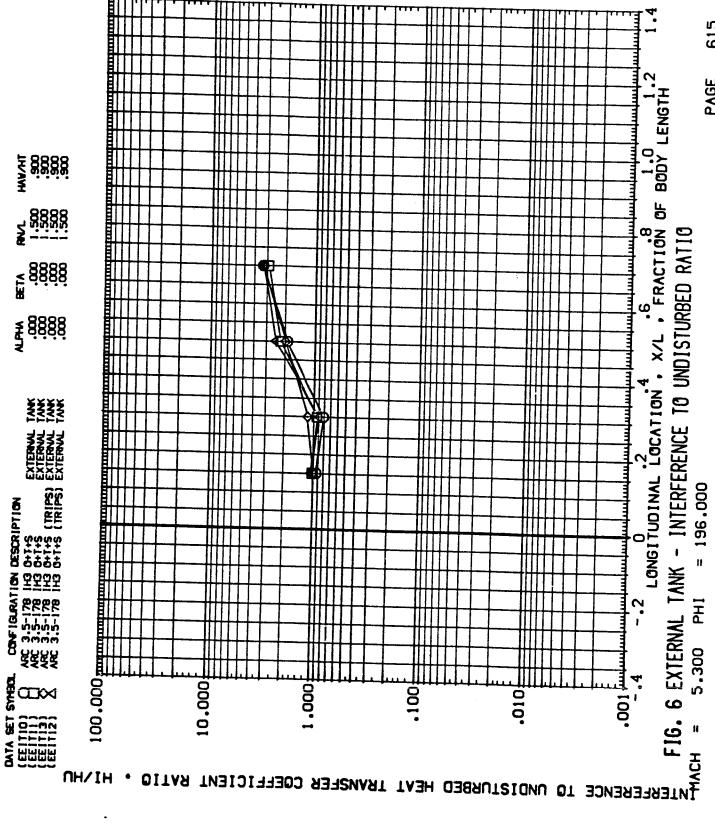


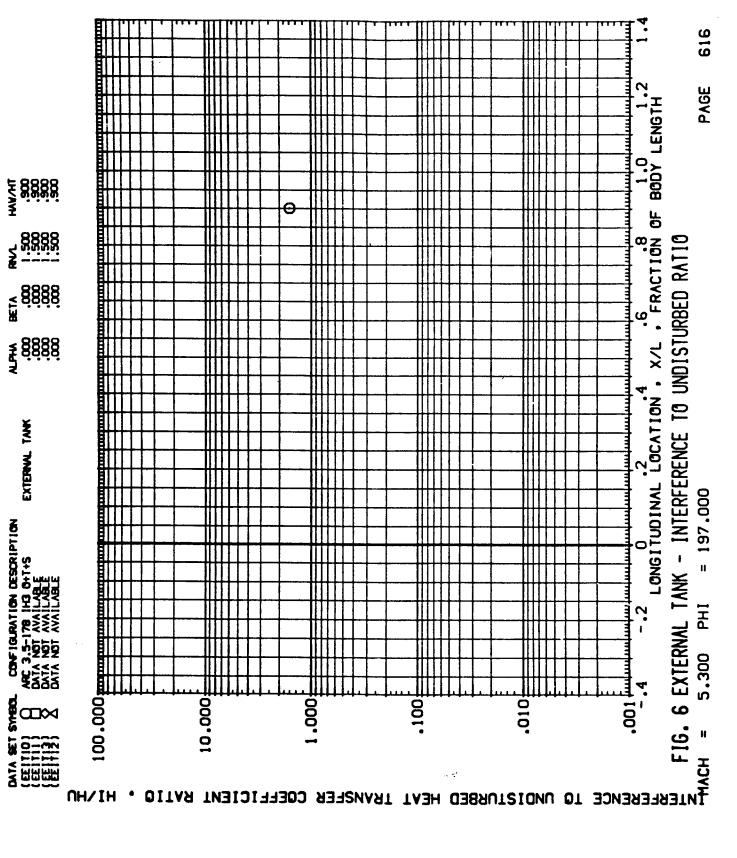






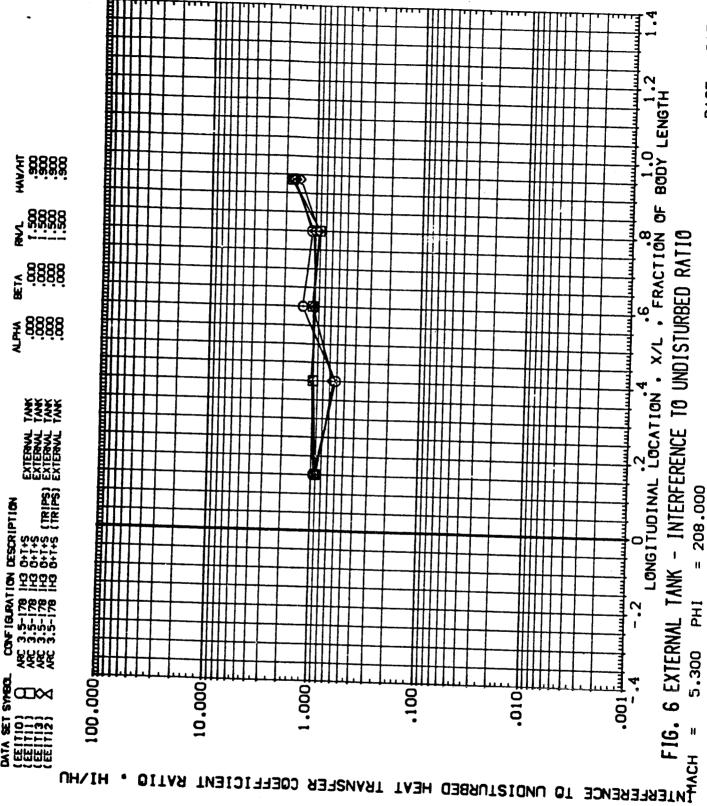


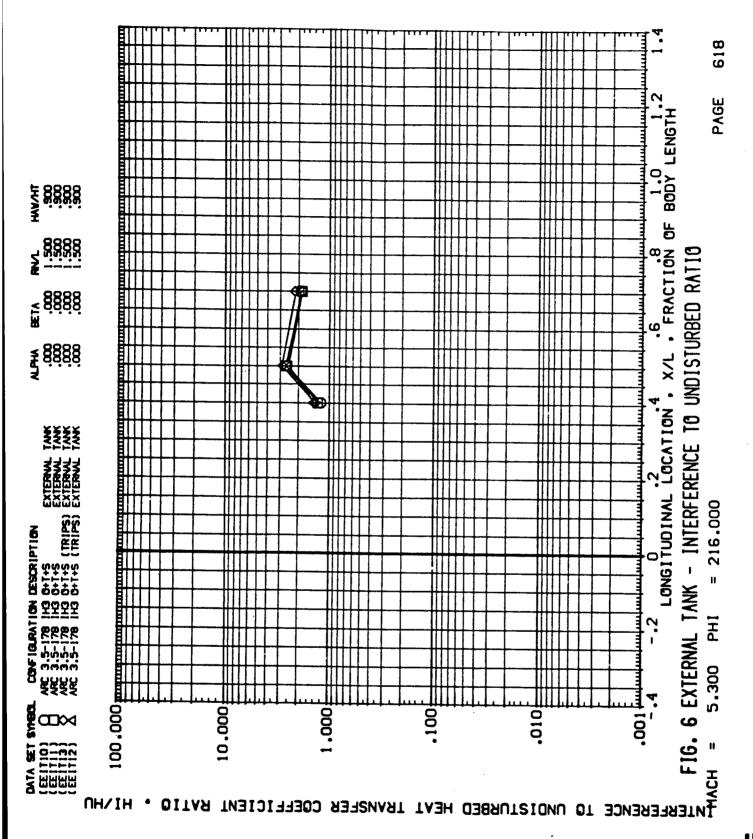




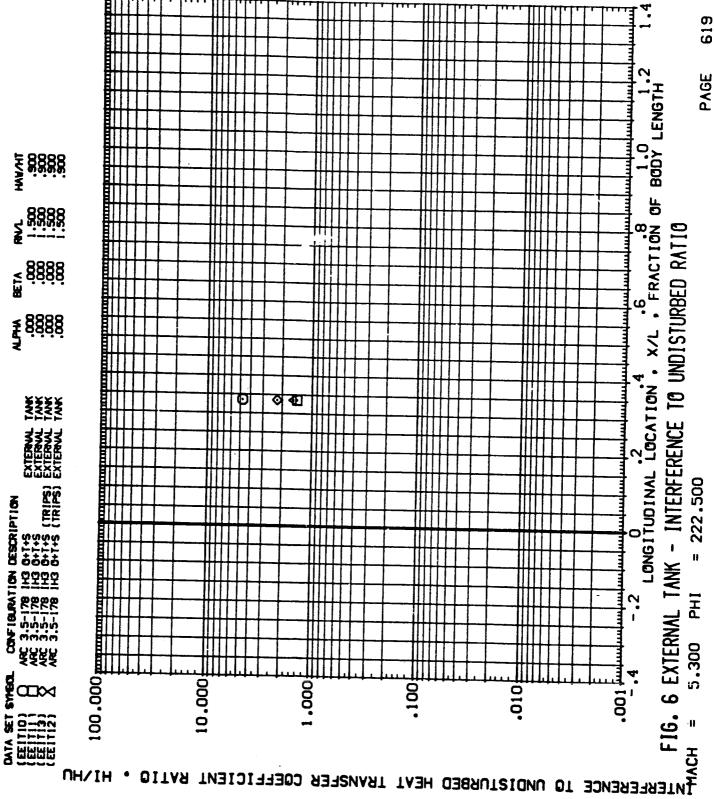
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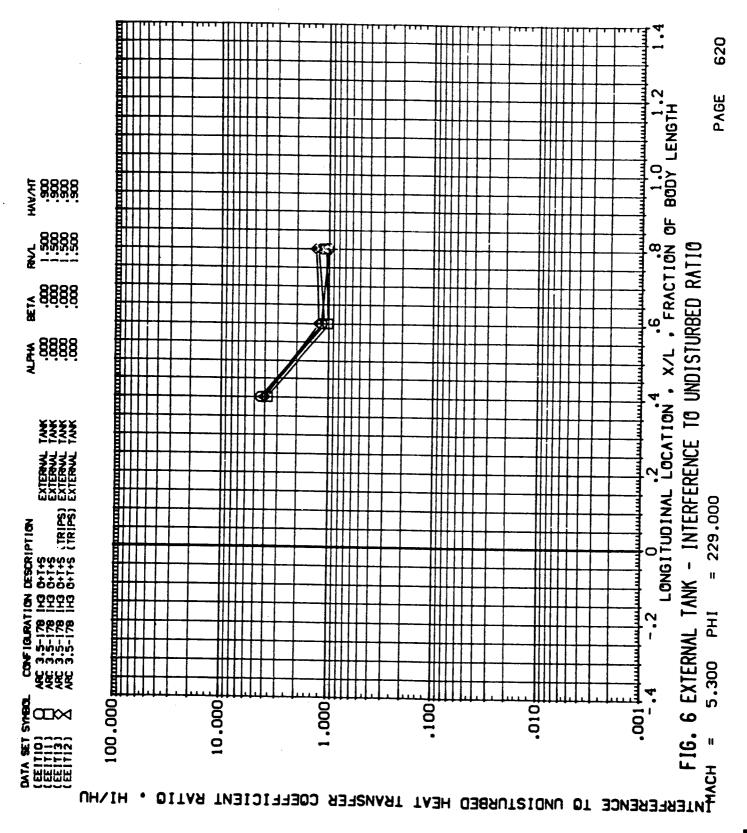




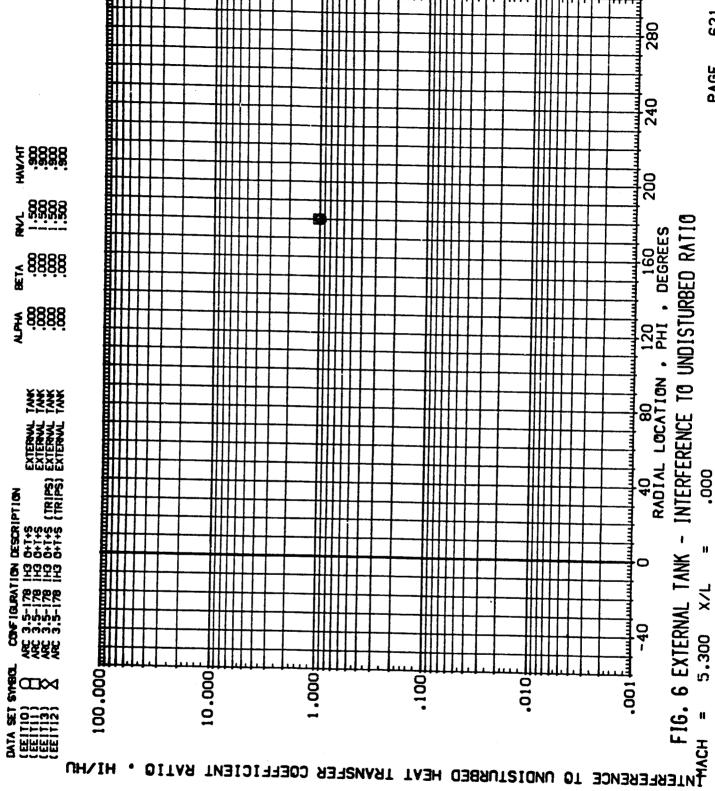


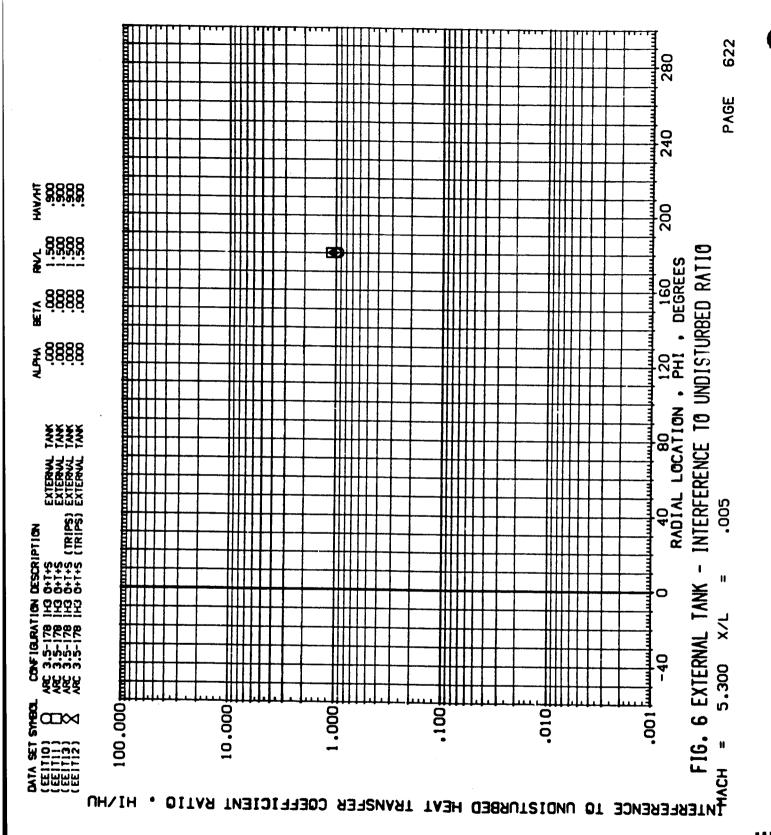




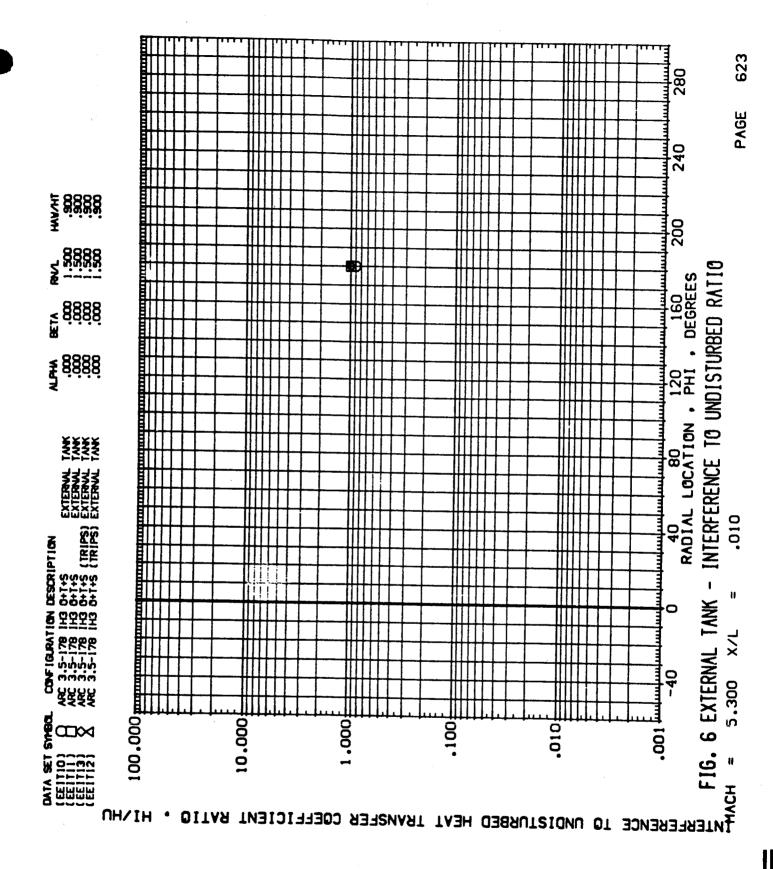


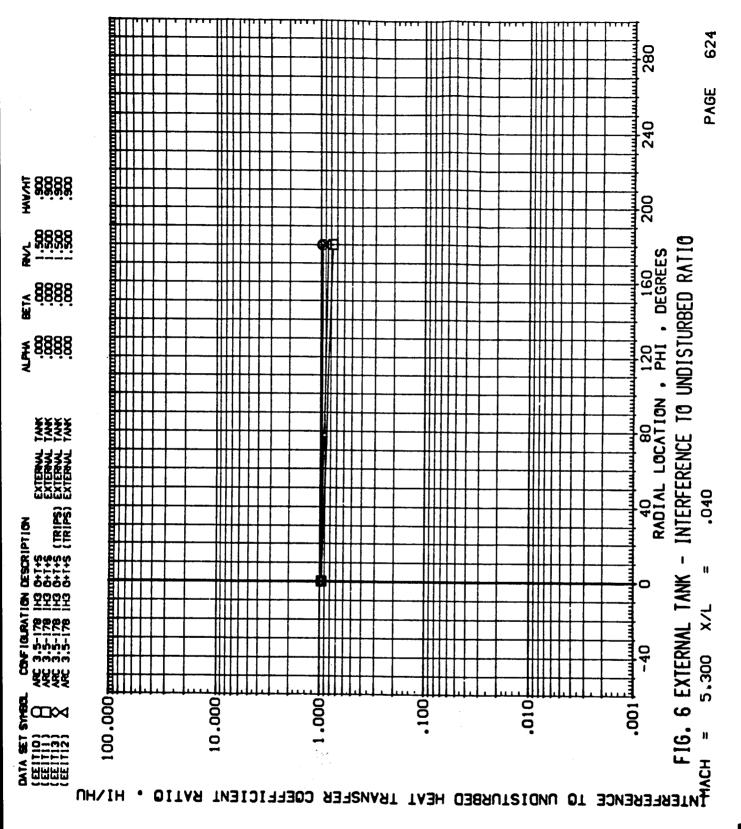




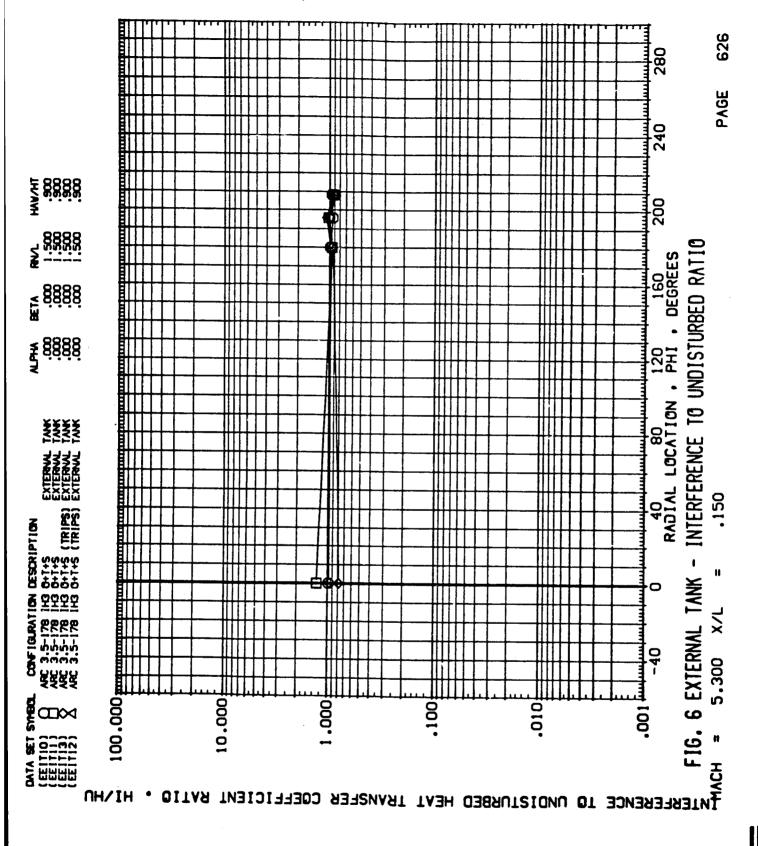




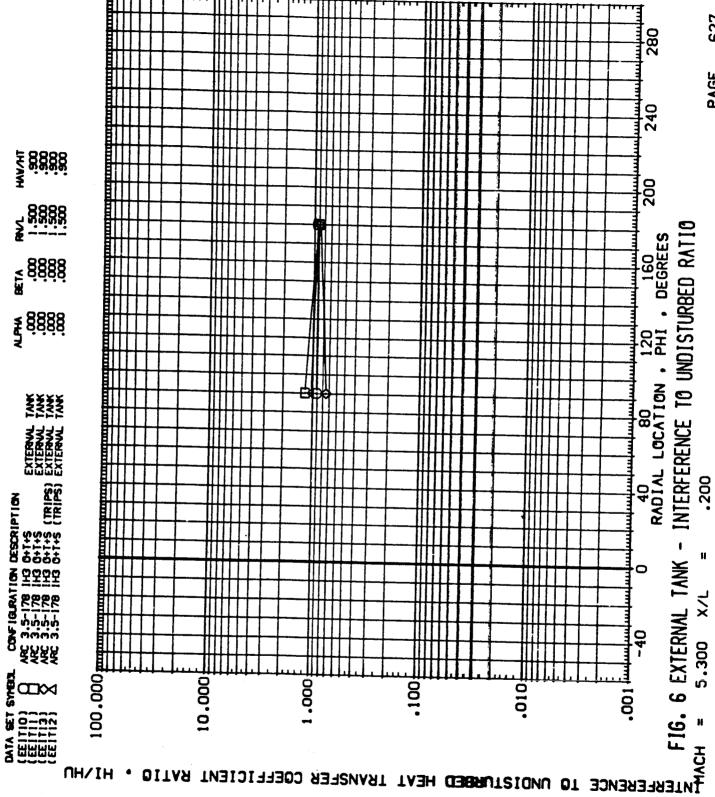


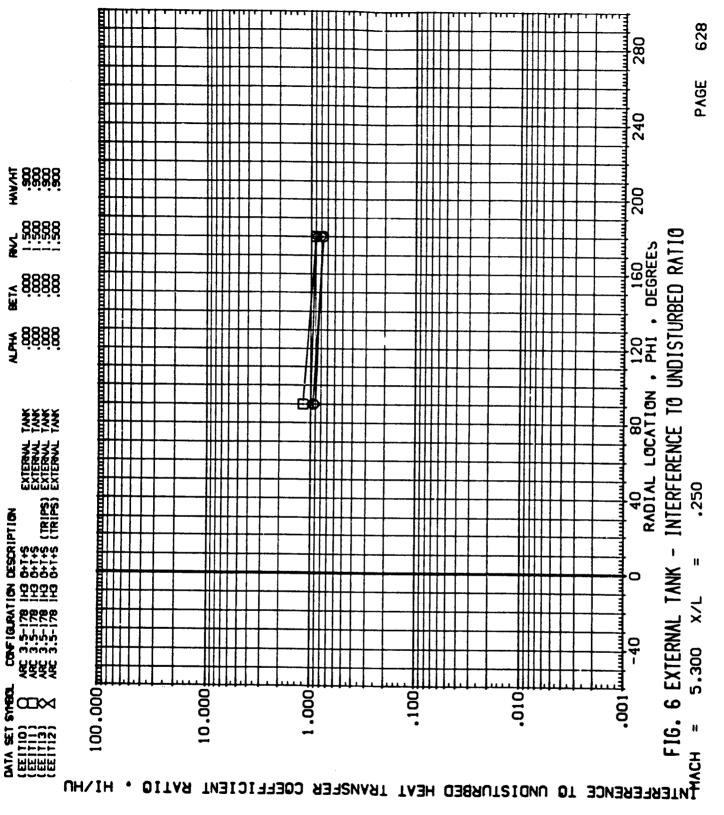


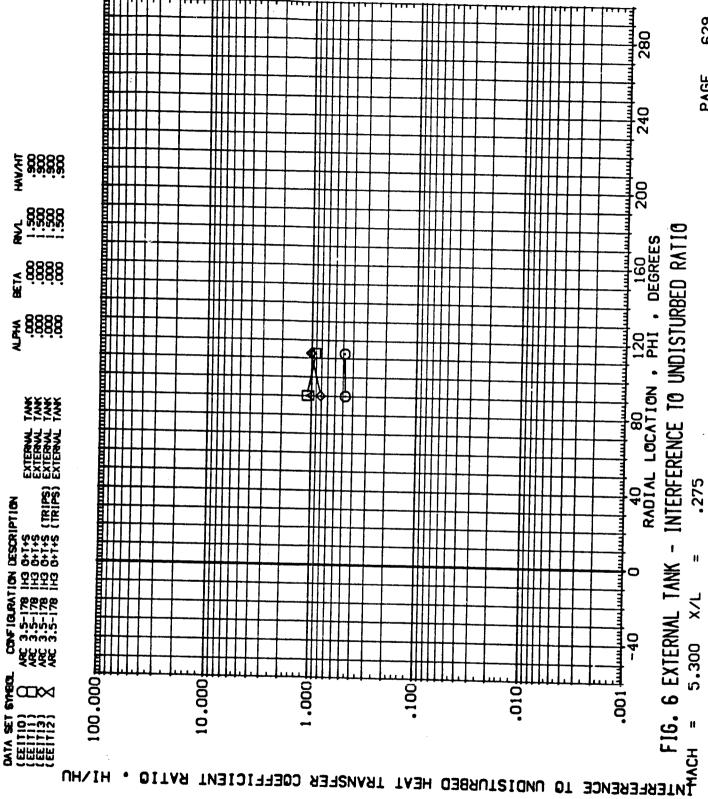


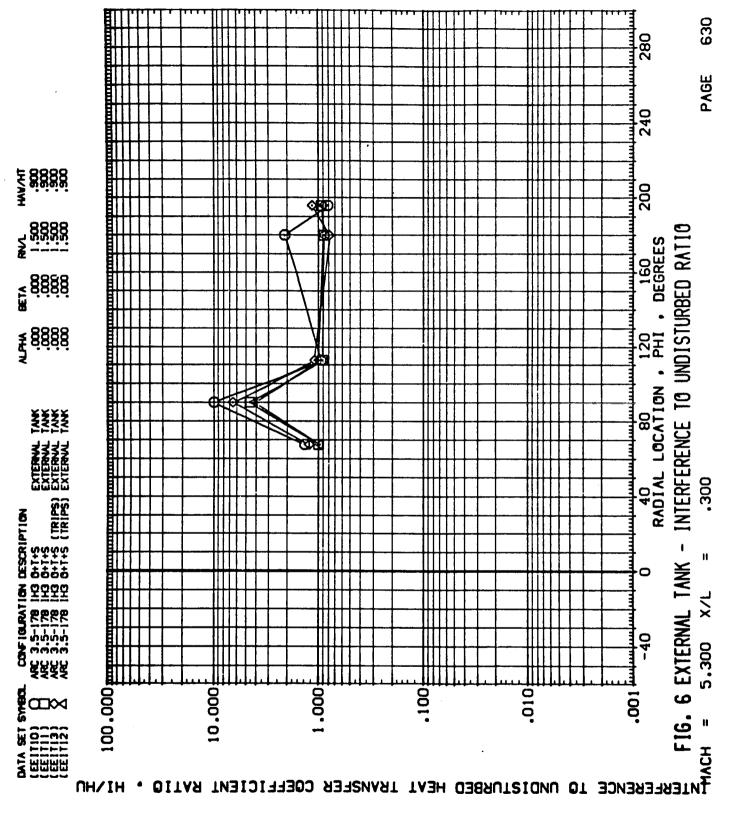




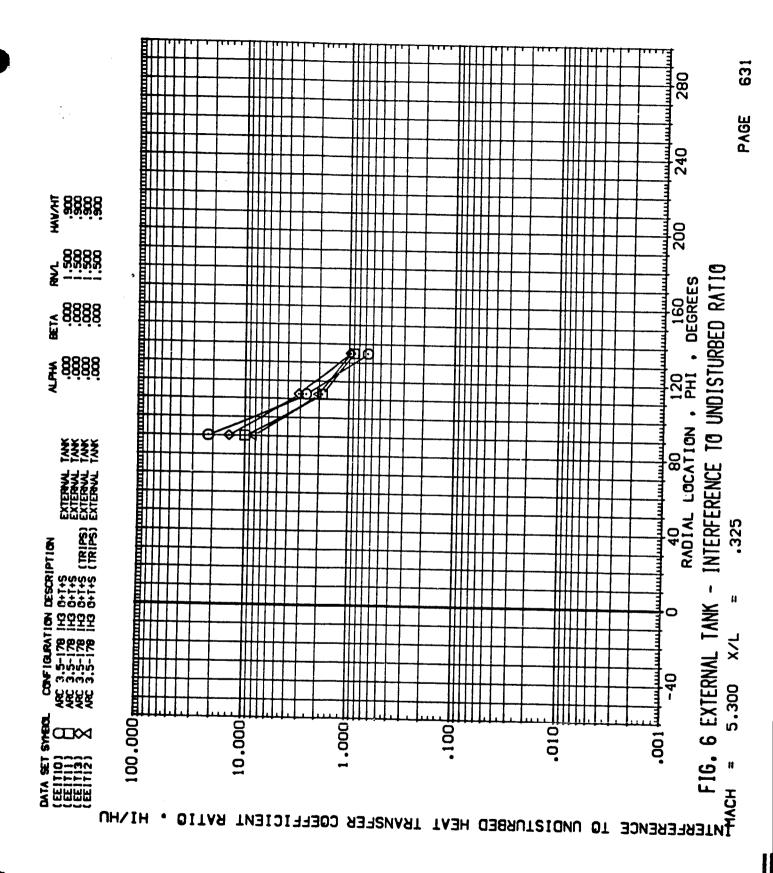


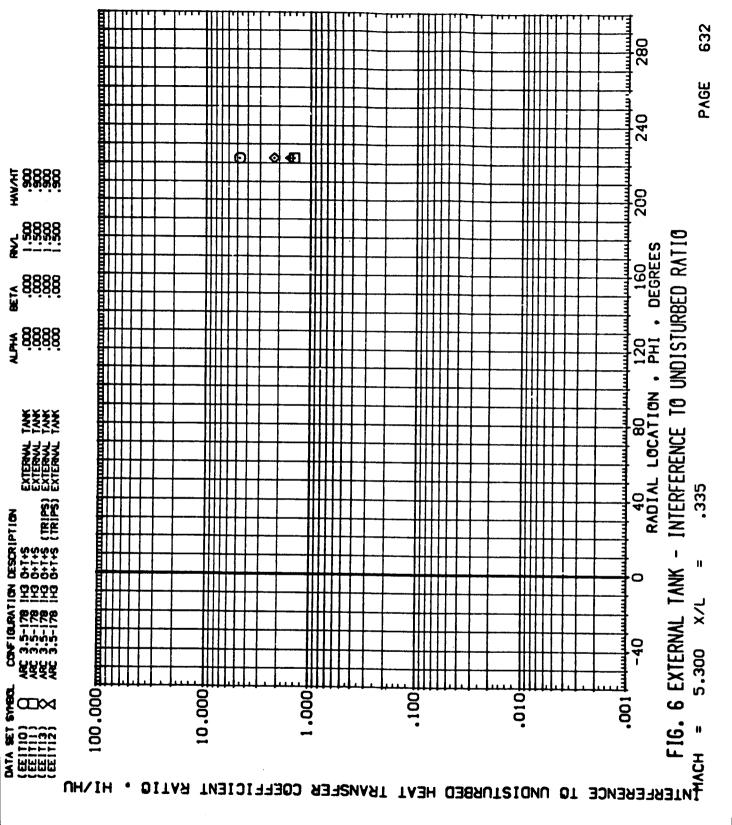




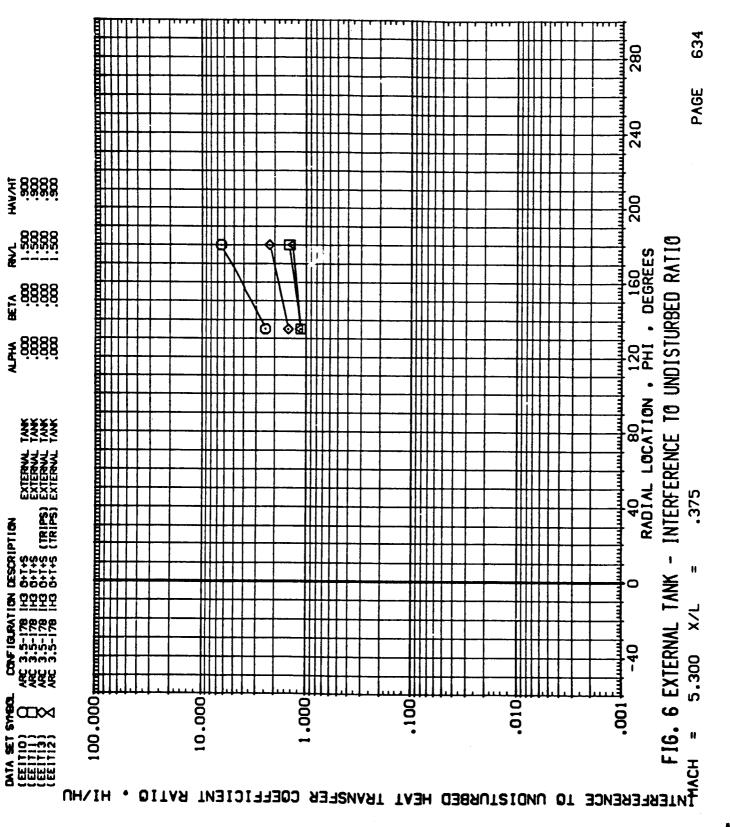




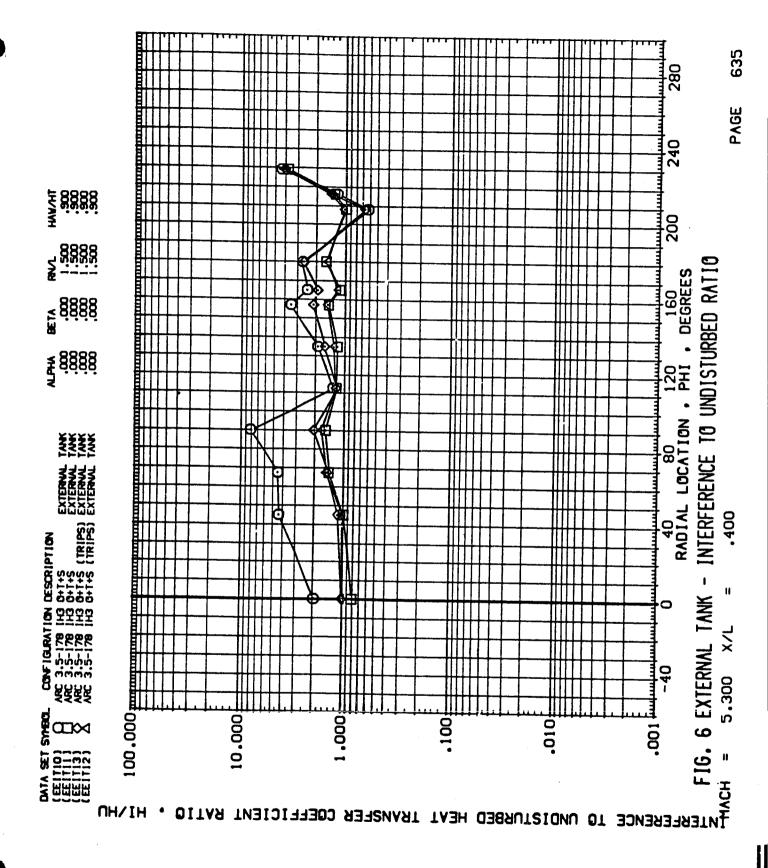


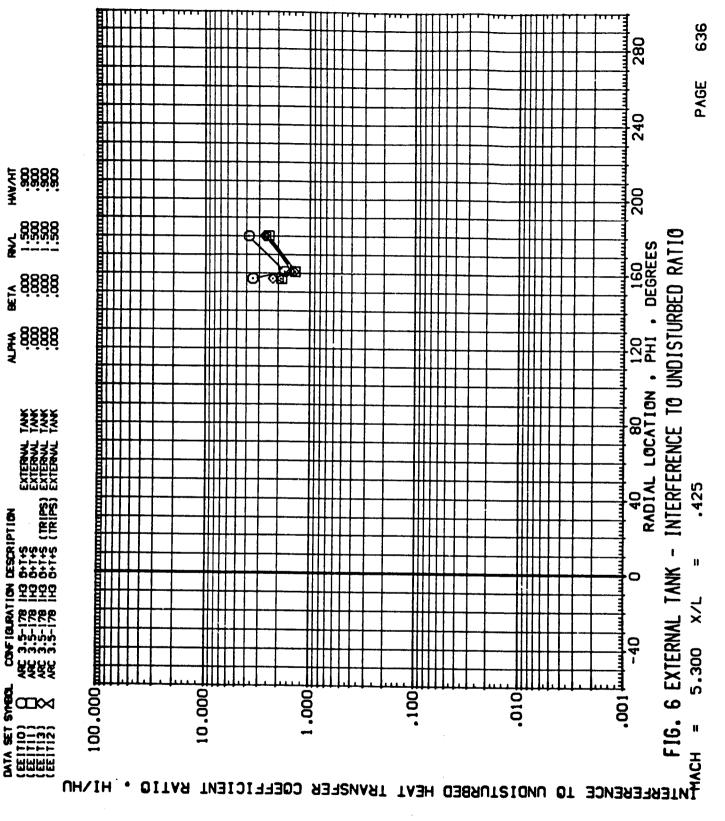




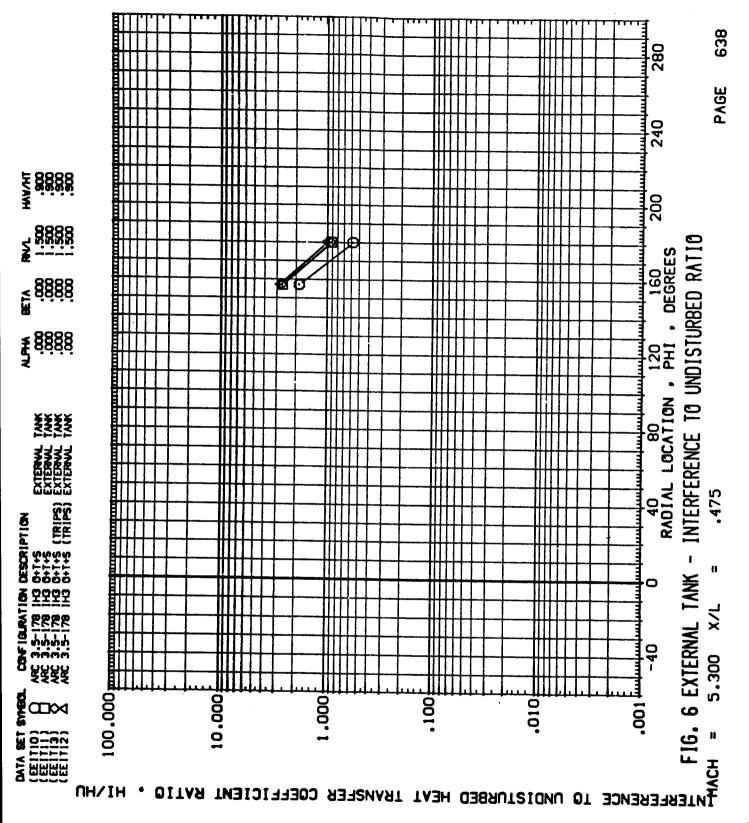




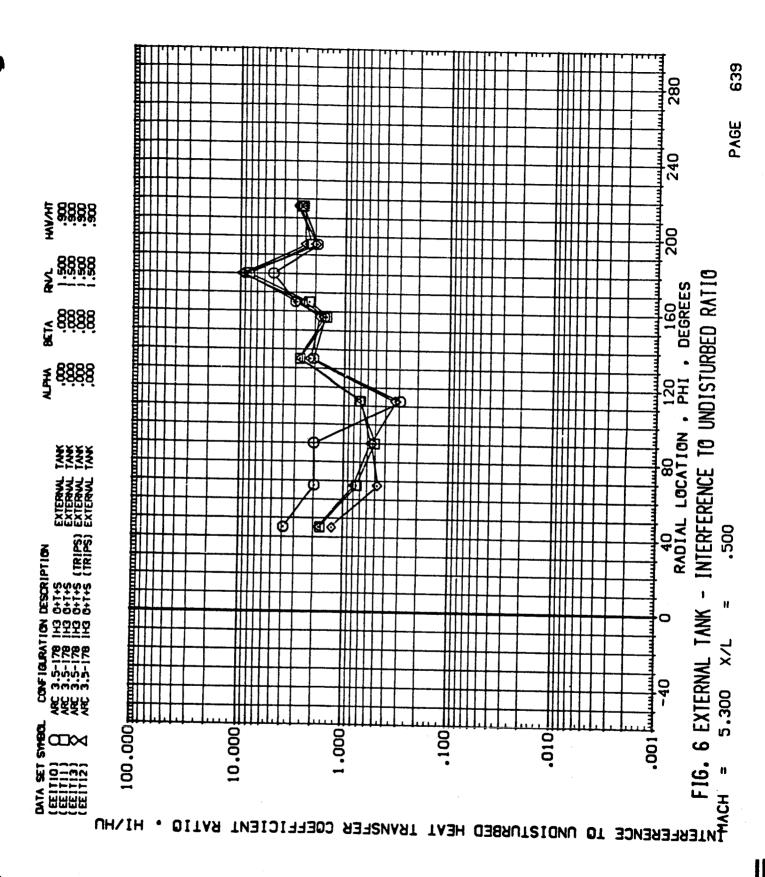


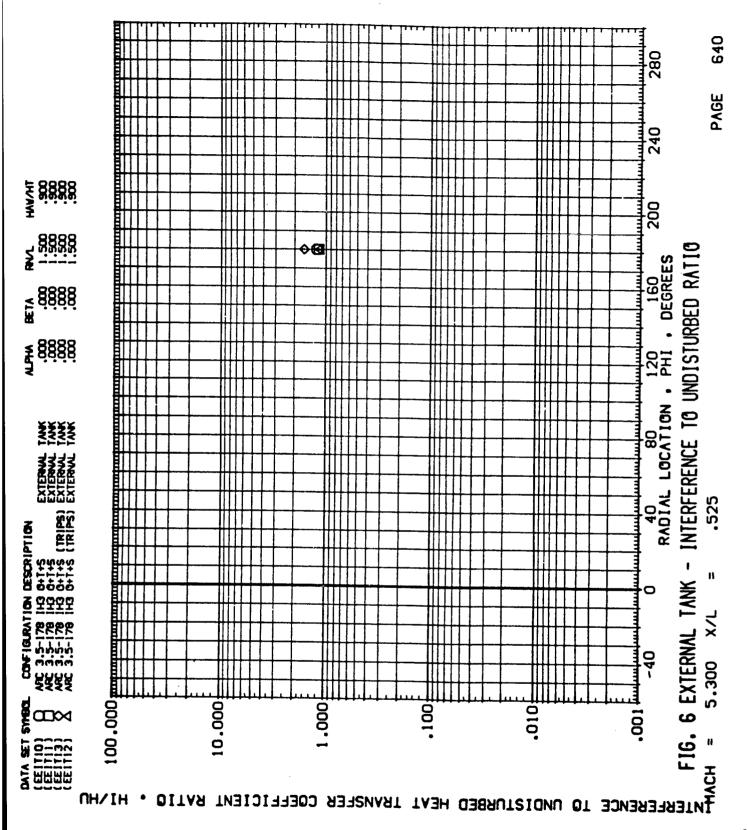




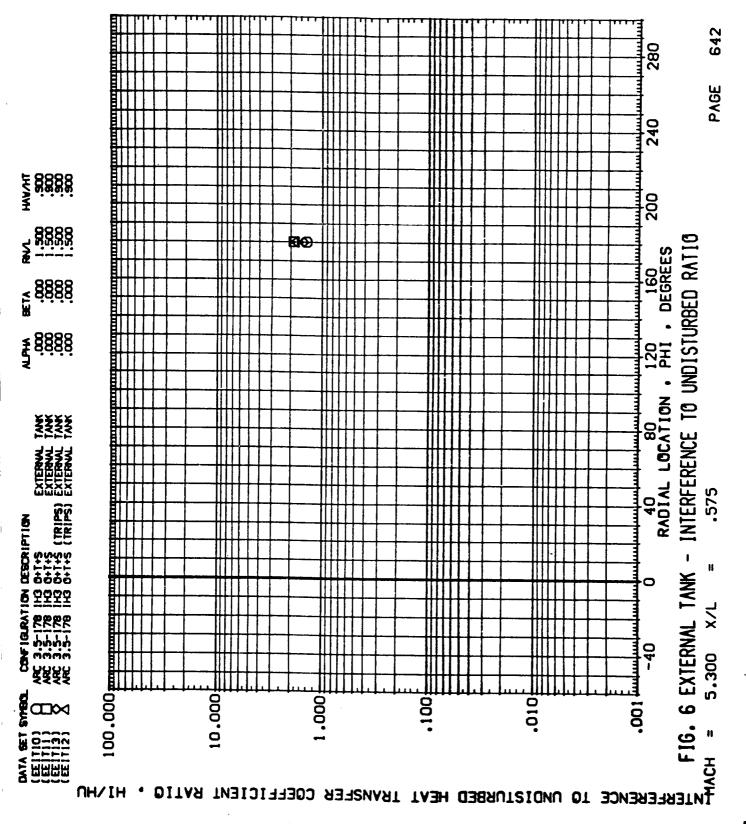




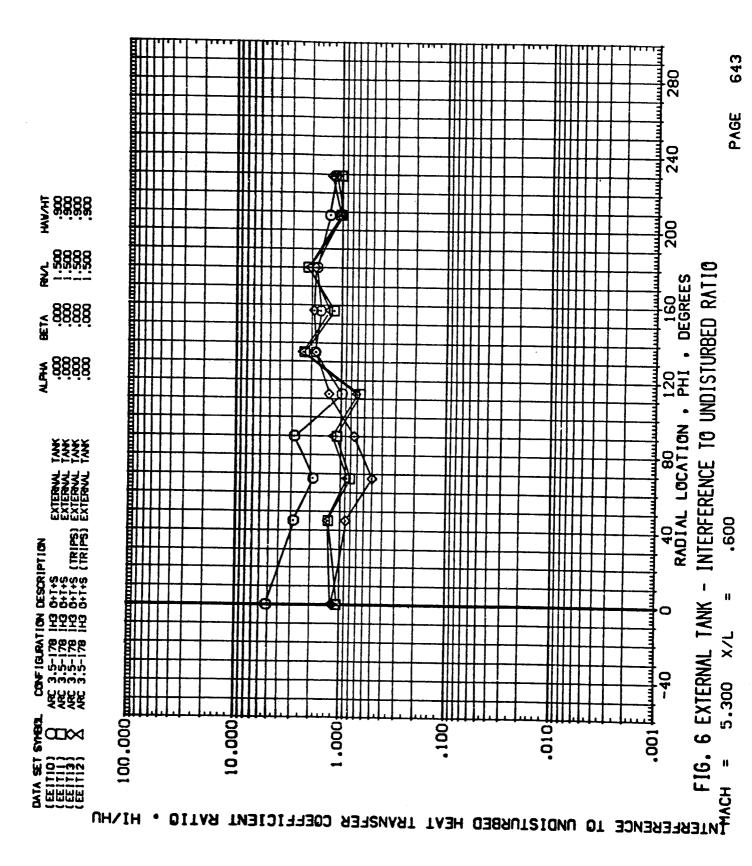


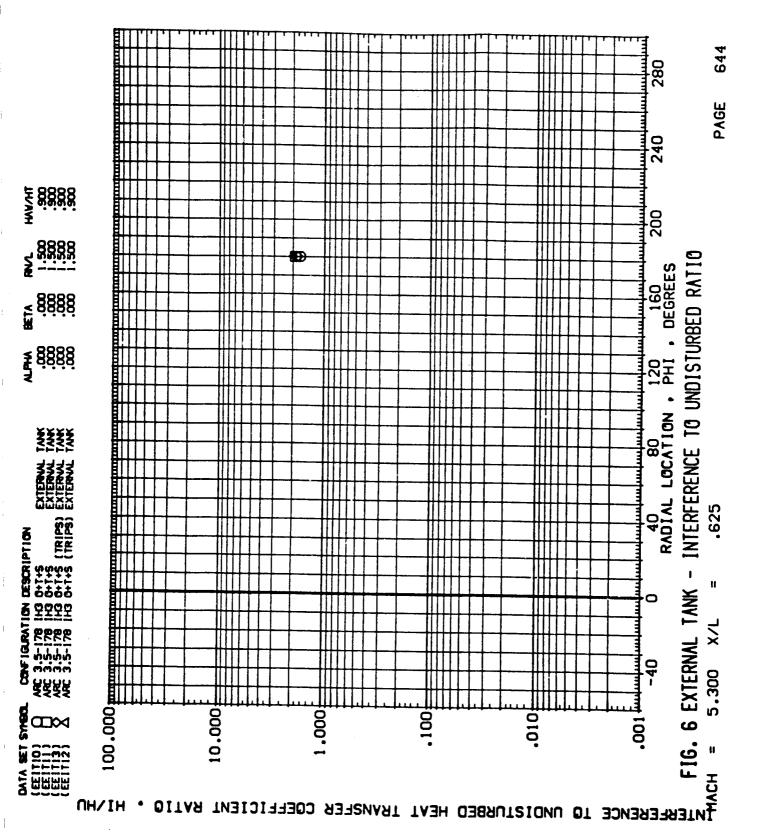




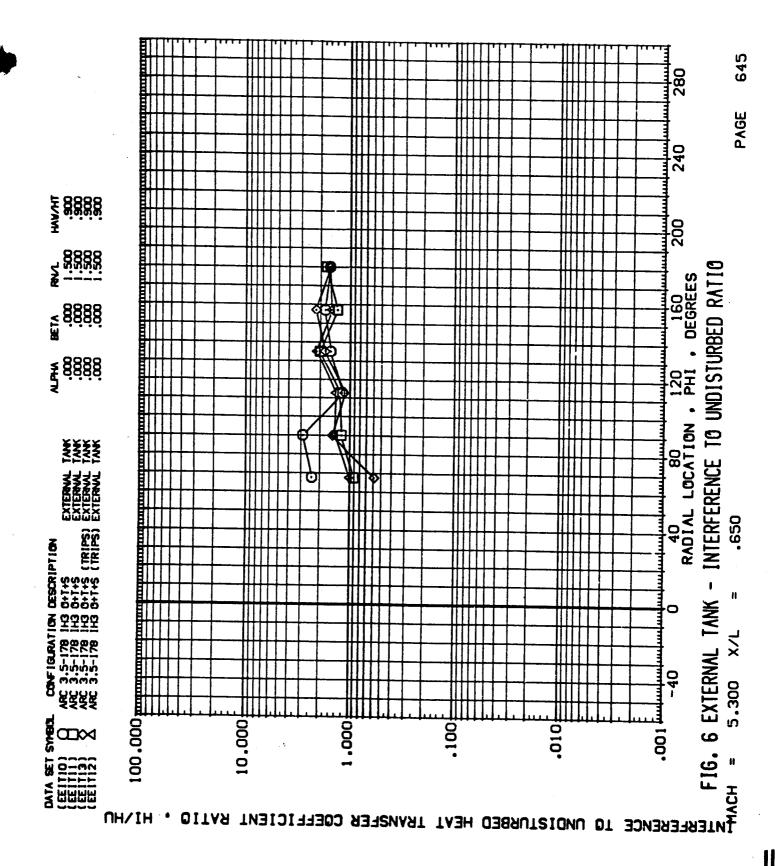


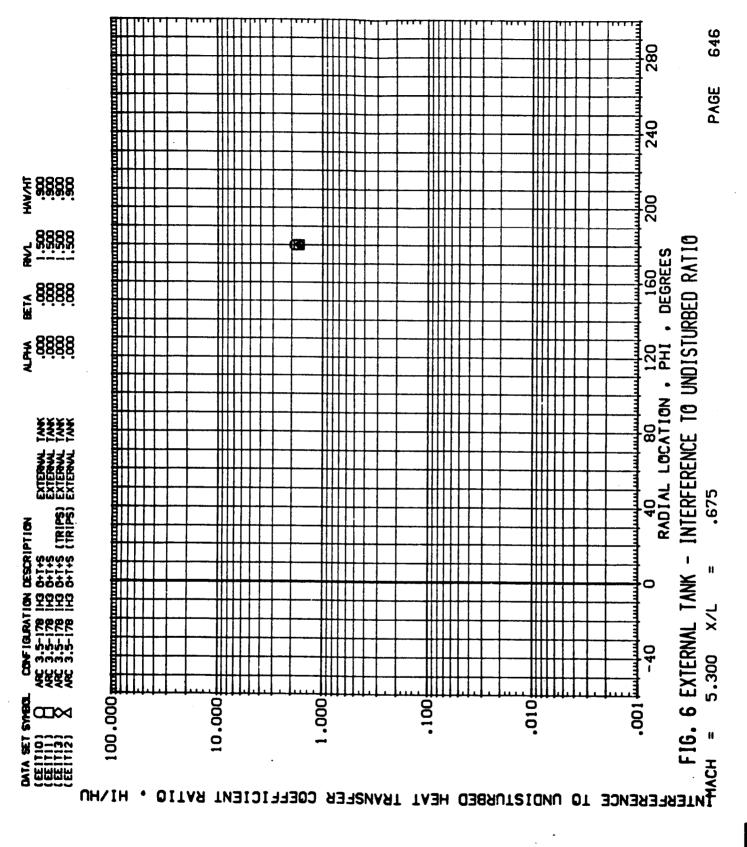




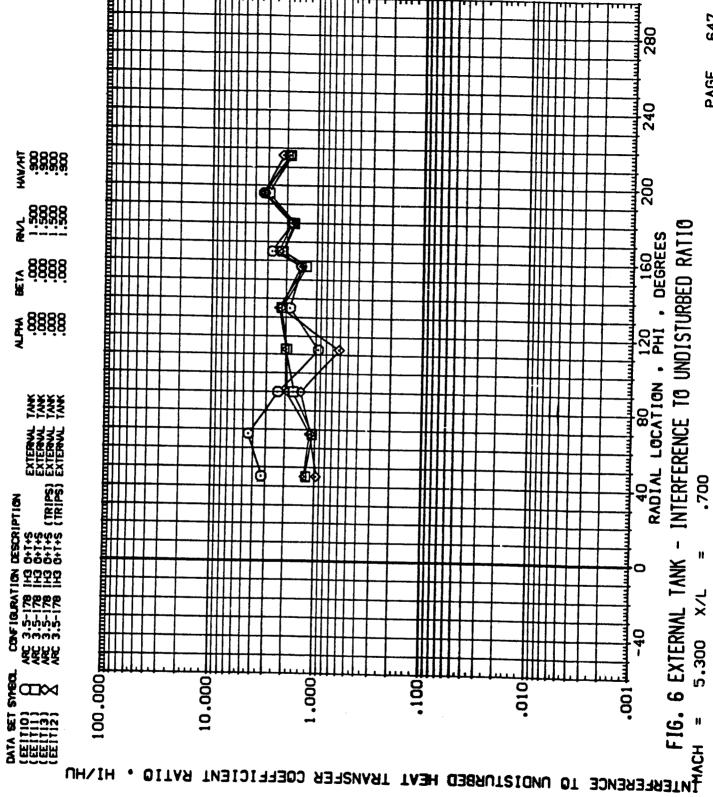


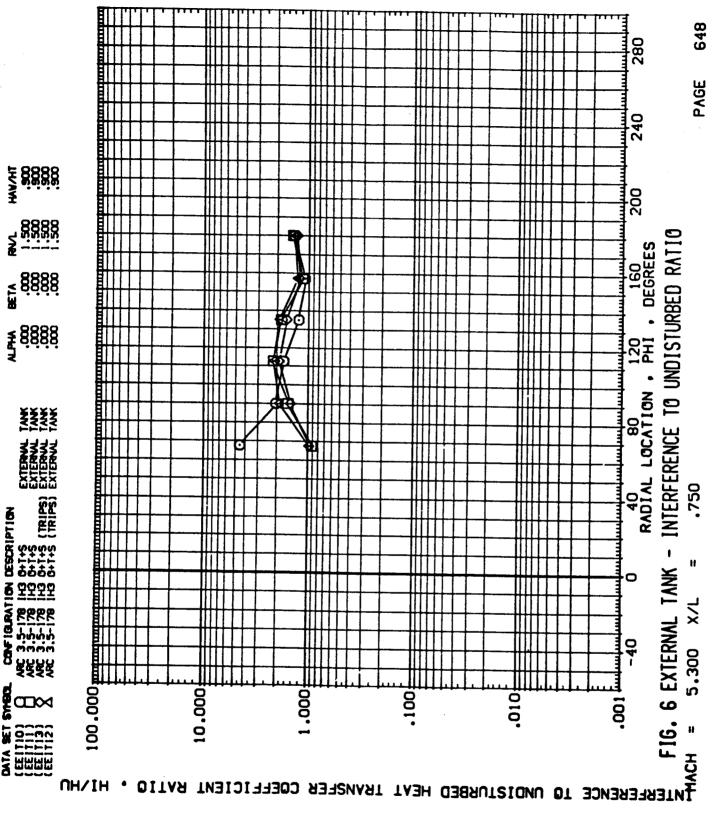












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